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Understanding the Organizational Decision Process
at
the Theater Commander-in-Chief Level of Command

by

Gregory H. Swain

March 1990

Thesis Advisor: Carl R. Jones

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This thesis focuses on understanding the organizational decision-making process that occurs at the theater Commander-in-Chief (CINC) level of command during times of conflict or war. This thesis is descriptive in nature and concerns the process used to make decisions; it makes no attempt to judge the appropriateness of the process or the quality of the decisions. Using a video of a seminar-format war game as a data source, the author viewed a theater CINC level decision-making group, coded the decisions, and recorded observations. Subsequent analysis resulted in the generation of hypotheses and conclusions. The author concludes that organizational decision-making at the theater CINC level uses a combination of decision processes, with the process depicted by the Carnegie model being the most prevalent. The decision-making group places an emphasis upon goal consensus, and their state of technical knowledge is dependent upon the stability of the external environment.

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the Theater Commander-in-Chief Level of Command

by

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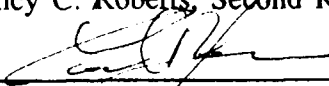
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ABSTRACT

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I. INTRODUCTION

A. BACKGROUND

Much of the previous research on military decision making has focused on decisions made by individuals at levels of command where the decision outcomes are rapidly apparent and relatively easy to quantify. However, the process used by organizations is inherently more complex than the process used by individuals, since organizations are composed of individuals that must interact on a social, as opposed to a solitary, basis (Vroom and Yetton, 1973, pp.4-5). Consequently, organizational decision-making groups, or decision makers, are subject to both cognitive and affiliative constraints (Janis, 1989, p.45).

While it is difficult to identify the quality of decisions made at the theater Commander-in-Chief (CINC) level of command, it is possible to look at the decision-making process. Research indicates that the process which an organization uses to make decisions is related to the organizations performance (Janis, 1989, p.128; Fredrickson and Mitchell, 1984, p.399). Rohrbaugh has suggested that in dealing with a group of experts, the way to evaluate their effectiveness is by directing attention to the process used by the group, not the subsequent outcome (Rohrbaugh, 1987, p.257).

This thesis focuses on gaining an understanding of the organizational decision-making process used at the theater CINC level of command, an echelon that has been

generally overlooked. This thesis makes no attempt to evaluate the effectiveness or quality of decisions.

B. THE RESEARCH QUESTION

The research question which guided this research is "What organizational models of decision making can characterized theater CINC warfighting decisions?" Secondary questions contained within the primary question are:

1. Is there goal consensus within the decision-making group and how is it reached?

2. What is the technical knowledge of the decision-making group; i.e., the degree of understanding and agreement about how to achieve the organizational goals?

3. What is the research utility of using video records of theater CINC war games to analyze the theater CINC organizational warfighting decision process?

C. SCOPE

The domain of this thesis is the organizational decision-making process that occurs at the theater CINC level of command during times of conflict or war. This thesis is descriptive in nature and concerns the process actually used to make decisions: it makes no attempt to determine the appropriateness of the process or to judge the quality of the decisions made. The research was limited by a lack of published domain related data or research and the present absence of a war or conflict. In lieu of real-world data the author used a video record of a theater CINC war game as the data source.

D. SUMMARY OF FINDINGS

The author found that the theater CINC operates in an external environment that encompasses "high-velocity" environments; environments which are characterized by constantly changing conditions.

The decision process which occurs at the theater CINC level is different, in the time sense, from junior levels of command. The theater CINC is called upon to make fewer decisions within the same time period as the junior commands and therefore has more time available for each decision.

The theater level CINC uses a combination of decision processes. These processes include:

1. The management science model

2. The Carnegie model

3. The incremental decision process model

4. A composite process which is a sequential combination of the Carnegie model and the incremental decision process

5. A "bounded" management science model where judgment is used in place of analysis

The theater CINC and his subordinate commanders initially display a low goal consensus for unfamiliar problems and a high goal consensus for familiar problems. The group reaches a goal consensus for unfamiliar problems by having an open discussion that continues until a general consensus emerges. The CINC uses consensus with

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qualification, a technique which is useful in resolving all but the most serious conflicts within a group and increases the speed with which decisions can be made.

The theater CINC and his subordinates are familiar with the situation of full scale conflict with the Soviet Union and consequently have a high goal consensus when they are faced with this situation. When faced with deciding war deterrence or war termination actions for an unfamiliar external environment, the group initially displays a low goal consensus and looks to the NCA to establish the military goals. In the absence of specific military goals and objectives from the NCA, the group develops their own consensus on military objectives and adopts an incremental military strategy.

The group exhibits a high state of technical knowledge when operating within an environment that is within their sphere of influence, or which is familiar to them, and when the environment remains stable over the time required for the group to achieve their organizational goal. However, when operating within an environment that involves other forces, such as the Soviet's, the group's understanding of how to achieve their organizational goal is limited, in the time scale sense, by the uncertainty of the environment. When this type of environment occurs the group exhibits a low state of technical knowledge. Solutions are selected through a bargaining process, and the group uses incremental solutions to compensate for uncertainty in the environment.

The process characterized by the Carnegie model is used more frequently than any other process. The time required to make a decision is related to goal consensus and to technical knowledge. Decisions take the least amount of time when there is a high goal consensus and a high state of technical knowledge, and these conditions lead to the

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decision process depicted by the management science model. Decisions take longer to reach when there is a low goal consensus or a low state of technical knowledge. Decisions take the longest when both goal consensus and technical knowledge are low, and the resulting decision process can be characterized by a composite of the Carnegie and the incremental decision process models.

Video records of theater CINC war games are valuable sources of data on organizational decision making at this generally unexplored level of command. Much of the research done on military decision making has been focused on levels of command that are junior to the theater CINC.

The theater CINC plays a vital role in determining the theater wide military goals and strategies during a war or conflict.

E.   ORGANIZATION OF STUDY

In Chapter II the author discusses existing models of organizational decision making and provides the foundation for understanding the conclusions. Chapter III contains a general description of the observed war game. In Chapter IV the author covers the method used to observe the war game. Chapter V presents the data: a compilation of the authors observations and a brief description of each of decisions made by the decision-making group. The author's analysis of the observations is contained in Chapter VI. Chapter VII builds upon the previous chapters to develop hypotheses on decision making at the theater CINC level. In Chapter VIII the author documents lessons learned. Chapter IX contains the conclusions and summarizes the answers to the research question.

The variables used to code the observed decisions are located in Appendix A while the results of the coding and a daily timeline of the decisions are contained in Appendix B.

II. CONTEMPORARY MODELS OF ORGANIZATIONAL DECISION-MAKING

PROCESSES

Decision making can be looked at from many different angles. When decision making is studied empirically, different approaches can lead to confusion unless there is a clear understanding of the model domain.

Decisions are usually divided into two large categories based upon the entity that is making the decision: individuals or organizations. Within each category it is possible to have further divisions and look at (1) the actual decision that was reached, or (2) the process by which the decision was reached. Put in other terms, it is possible to draw a box around the decision and limit the observations and analysis to the inputs and outputs, or it is possible to look only at what happens inside the box. Models that deal with the decision itself are commonly referred to as *structural models*. Models that deal with how the decision was reached are called *process models*. In their discussion of decision making and decision theory, Abelson and Levi make the following distinctions:

> Structural models describe the observable input/output relationships for decision behavior. In contrast, *process models* are concerned with the dynamic aspects of decision making, with the heuristics and algorithms that people use in dealing with decision problems. Structural models focus on the *what* of decision behavior, but process models focus on the *how*. (Abelson and Levi, 1985, p.254)

> The investigator may be concerned either with *what* the decision maker chooses or with *how* choices are made. The former orientation leads to a study of input/output relationships, i.e., with the *structure* of sets of choices made under specified conditions. The latter promotes analysis of the intervening steps in the cognitive *processing* of choice situations. (Abelson and Levi, 1985, p.232)

The domain of decision models can be reduced even further. Structural and process models can restrict themselves to describing vhat will happen, or they can model what should happen for a high quality decision. Normative models are concerned with optimizing the quality of the decision, or decision process, while descriptive models limit the model domain to what has been observed to actually occur. Vroom and Yetton have noted the difference between normative models and descriptive models as they pertain to the decision process:

> "Two theoretically distinct sets of questions can be asked concerning the manager's choice of a decision process. One contains the normative questions as to which process should be used to make the decision. The other consists of the descriptive questions concerning which decision-making process would actually be used." (Vroom and Yetton, 1973, p.6)

The domain of this thesis is the organizational decision-making process that occurs at the theater CINC level of command. The author has no basis for judging the quality of the decisions that were reached during the observed war game and accordingly has limited the discussion and application of decision process models to descriptive models. This chapter includes descriptions of both individual and organizational descriptive decision process models. The individual models are included because they have counterparts in the organizational models, and organizations are composed of individuals who make their own decisions and then interact to make organizational decisions.

A. INDIVIDUAL DECISION MAKING

1. Rational Model

The rational model assumes that the decision maker is rational and when faced with a problem will systematically analyze the problem, explore all reasonable solutions, and chose the solution that best advances the decision maker's interests. Daft breaks the rational model down into the following eight steps:

1. Monitor the Decision Environment

2. Define the Decision Problem

3. Specify Decision Outcomes

4. Diagnose the Problem

5. Develop Alternative Solutions

6. Evaluate Alternatives

7. Choose the Best Alternative

8. Implement the Chosen Alternative

(Daft, 1989, p.357)

2. Bounded Rational Model

The bounded rational model is used to explain deviations from the rational model. The rational model assumes that there are no time pressures, no limits on resources, the actor will behave rationally, and there is negligible uncertainty. In contrast, the bounded rational model takes into account the constraints and limits put on the

decision maker. Under actual conditions a complete analysis is often impossible or the decision maker may not think that the decision warrants a formal analysis. The decision could be about what something the decision maker considers as minor or of limited relevance. Weick noted that:

> The essence of this notion is that individuals have perceptual as well as information-processing limits, and even though they may intend to act rationally, they can do so only in a limited fashion. This limited fashion consists of acting on the basis of sufficient knowledge rather than complete knowledge (the concept of satisficing); of using simple, unlaborious rules to search for a solution when a problem arises (e.g., searching in the immediate vicinity of the problem); and of using shortcuts whenever possible. (Weick, 1979, p.20)

Intuition is often associated with the bounded rational model, and when this occurs judgment and experience substitute for analysis (Daft, 1989, p.360). This is not as arbitrary as it may seem, for intuition is based upon past experience. Past experience allows an individual to perceive patterns and process information without going through a deliberate chain of reasoning (Benderly, 1989, pp.36-40).

B. ORGANIZATIONAL DECISION MAKING

Organizational decision making is more complex than individual decision making, for it involves both individual decision making and social interaction. In his discussion of the cuban missile crisis, Anderson has noted that: "...understanding organizational decision making...requires integrating the behavioral aspects of individual information processing and decision making with the social and symbolic interaction views of organizations." (Anderson, 1983, p.202) Vroom and Yetton have also written about the differences between individual and organizational decision making:

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It can be argued, however, that the processes of problem-solving and decision-making when carried out by organizations are different from the same processes carried out by individuals in at least one fundamental respect. Organizational decision-making involves both cognitive and social processes. The events that intervene between the identification of a problem (or occasion for decision-making) and a solution or decision are both intrapersonal and interpersonal. It is the interpersonal or social aspects of decision-making that are of most relevance to processes of leadership. The leader not only makes decisions but also designs, regulates, and selects social systems that make decisions. (Vroom and Yetton, 1973, pp.4-5)

Decisions made by organizations often involve multiple individuals, and each of these individuals may act rationally, or with bounded rationality. The individuals may have different objectives, concerns, and backgrounds. In addition to individual cognitive constraints the organizational decision-making group is also subject to another set of affiliative constraints. These constraints may include a need for approval, acceptability, or support from the other group members (George, 1980, p.2).

In 1969 Allison described three organizational decision-making process models: (1) the rational policy model, (2) the organizational model, and (3) the bureaucratic politics model (Allison, 1986, p.312). In 1972 March suggested an additional model: the garbage can model (Huber and McDaniel, 1986, p.578). The models introduced and described by Allison and March have become the standards. They have been given different names by various authors but the classification and descriptions of the models have generally remained the same. Pennings refers to the four organizational decision-making process models as (1) the rational model, (2) the bounded rational model, (3) the political model, and (4) the garbage can model (Pennings, 1986, p.219). Bui also discusses the four models but uses a different set of names:

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At least four basic classes of models must be mentioned: (i) the program/bureaucratic model, (ii) the rational choice model, (iii) the political model, and (iv) the cybernetic/garbage can model." (Bui and Jarke, 1987, p.6)

In his discussion of organizational decision making, Daft refers to the four models as (1) the management science model, (2) the Carnegie model, (3) the incremental decision process model, and (4) the garbage can model (Daft, 1989, p.363). Within this theses the author has chosen to adopt the titles used by Daft.

1.   Management Science Model

The management science model is the organizational equivalent of the individual rational model. This model stresses the systematic use of analytic tools to evaluate alternatives and to solve problems. "The rational agent selects the alternative whose consequences rank highest in terms of his goals and objectives." (Allison, 1986, p.316) This approach is an excellent choice when "...problems are analyzable and when the variables can be identified and measured." (Daft, 1989, p.364)

2.   Carnegie Model

The Carnegie model takes into account the political aspects of organizations and the bounded rationality of individuals. Allison has included the following in his description of the model: "The techniques employed in this process often resemble those used in legislative assemblies, though outcomes in the sense that what happens is not chosen as a solution to a problem but rather results from compromise, coalition, competition, and confusion among government officials who see different faces of an

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issue; political in the sense that the activity from which the outcomes emerge is best characterized as bargaining." (Allison, 1986, 330)

According to the model the use of coalitions and compromise have a significant impact upon the search procedures used to generate alternatives and solutions. Instead of generating optimal solutions the organization choses the first one that will satisfy the individual members. If the organization can not reach an compromise or coalition, then the results can be disastrous (Daft, 1989, p.366) In his discussion of the Carnegie model, Daft points out that it is often associated with upper management:

> The Carnegie model points out that building agreement through a managerial coalition is a major part of organizational decision making. This is especially true at upper management levels. Discussion and bargaining ar time-consuming, so search procedures are usually simple, and the selected alternative satisfices rather that optimizes problem solution. (Daft, 1989, p.366)

3. Incremental Decision Process Model

This model emphasizes the fact that many major decisions are made through a series of small decisions. Decision makers are often constrained by previous decisions, established procedures, or an unwillingness to radically deviate from established patterns. Decision makers often proceed along a course by taking small steps. If they run into a barrier, or failure, they cycle back through a previous decision and try something new (Daft, 1989, p.369). Allison's organizational model is analogous to the incremental decision process model. In describing his model he writes:

> Major lines of organizational action are straight, i.e., behavior at one time is marginally different from that behavior at t-1. Simpleminded predictions work best: Behavior at t+1 will be marginally different from behavior at the present time. (Allison, 1986, p.324)

George states that "...a decisionmaker employing the incremental strategy will consider a narrow range of policy alternatives that differ only slightly from existing policies and aim at securing marginal rather than dramatic improvements." (George, 1980, p.40)

4. Garbage Can Model

The garbage can model attempts to explain how decisions are made when the organization is subjected to a high degree of ambiguity in technology, preferences, and participation. Organizations that meet this criteria have been labeled as organized anarchies (March, Cohen, and Olsen, 1986, p.285). The garbage can model differs from the other models because it applies to the flow of multiple decisions within organizations (Daft, 1989, p.373) and assumes that decision makers, problems, and solutions all interact on a random basis. March and Olsen have written the following about their model:

> In pure form, the garbage can model assumes that problems, solutions, decision makers and choice opportunities are independent, exogenous streams flowing through a system (Cohen et al., 1972). They are linked in a manner determined by their arrival and departure times and any structural constraints on the access of problems, solutions and decision makers to choice opportunities. In the absence of structural constraints within a garbage can process, solutions are linked to problems, and decision makers to choices, primarily by their simultaneity. (March and Olsen, 1986, p.17)

In the garbage can model the decision-making process is not a logical sequence of events. Solutions may appear before problems, or in search of problems to attach themselves to, and problems may exist without ever being solved. Daft identifies four consequences of the garbage can model:

1. Solutions may be proposed even when problems do not exist

2. Choices are made without solving problems

3. Problems may persist without being solved

4. A few problems are solved

(Daft, 1989, pp.375-376)

5. Composites

It is possible to have a single decision-making process that encompasses both the Carnegie model and the incremental decision process model. If the problem is ambiguous, the decision-making group needs to reach some sort of consensus about the problem. Once this is accomplished, the group can proceed to solution generation and selection. If the solutions are ambiguous the group may use the incremental decision process and proceed on a trial-and-error basis. In this situation the Carnegie model would be applicable for the problem identification and the incremental decision process model would be applicable for the solution selection.

C. CONTINGENCY DECISION-MAKING FRAMEWORK

The contingency decision-making framework is used as a means of explaining how organizational settings and characteristics encourage the use of the different decision processes. The framework states that analyzing organizations along the dimensions of goal consensus and technical knowledge will indicate which decision process will be used to make decisions. (Daft, 1989, p.378)

1. Goal Consensus

Goal consensus refers to the level of agreement among the decision-making group. Goal consensus is most obvious in the problem identification phase of the decision. Groups that have a low goal consensus must put special emphasis on (1) coalition building during the decision process and (2) determining standards of performance that are acceptable to the group. Certain organizational structures encourage low goal consensus by having departments or divisions that specialize in different environments. (Daft, 1989, p.378)

2. Technical Knowledge

"Technical Knowledge refers to the understanding and agreement about how to reach organizational goals." (Daft, 1989, p.379) In order to understand how to reach organizational goals the group must have (1) knowledge of the environment that is germane to the problem and (2) the requisite technical skills. Technical knowledge is most visible during the solution generation phase of the decision-making process.

3. Contingency Decision-Making Framework

Figure 1 shows how goal consensus and technical knowledge affect the decision characteristics. According to the definition of goal consensus, a high goal consensus leads to low uncertainty in problem identification while a low goal consensus leads to high uncertainty in problem identification. Likewise, a high technical knowledge leads to low uncertainty in solution generation while a low technical knowledge leads to high uncertainty in solution generation.

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Goal   Consensus

High   Low

	High	Cell 1 Problem: low uncertainty Solution: low uncertainty	Cell 2 Problem: high uncertainty Solution: low uncertainty
Technical Knowledge	Low	Cell 3 Problem: low uncertainty Solution: high uncertainty	Cell 4 Problem: high uncertainty Solutior: high uncertainty

Source: (Daft, 1989, p.380)

Figure 1. Integration of De⁻ˑ ˑ Charecteristics with Contingency
Decision-Making Fran.̲work

Figure 2 is a graphic representation of the framework and translates the decision

characteristics (levels of uncertainty) into decision process models. In his description of

the framework Daft states:

Goals and technical knowledge determine the extent to which problem identification
and solution stages are uncertain. Depending on the situation, an organization may
have to focus on gaining goal consensus, increasing technical knowledge, or both.
Low uncertainty means that rational, analytical procedures can be used. High
uncertainty leads to greater use of judgement, bargaining, and other less systematic
procedures. (Daft, 1989, p.379)

Cell 1 indicates that groups with high goal consensus and high technical knowledge will

be inclined to use the management science model to decision making. Cell 2 indicates

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that groups with low goal consensus and high technical knowledge will resort to the process of coalition building and bargaining represented by the Carnegie model. Cell 3 has high goal consensus but low technical knowledge. Accordingly, the group will have agreement on what to do but will have to resort to the incremental decision making process to arrive at solutions. Cell 4 has low goal consensus and low technical knowledge. To reach a decision under these circumstances the framework indicates that the group will have to use coalition building and bargaining (the Carnegie model) to reach an agreement on the problem and then use the incremental decision making process to generate a solution. If an organization experiences a large percentage of decisions that fit this description, then the organization may be an organized anarchy, and the garbage can model could apply to the flow of decisions within the organization.

Goal   Consensus

	High	Low
High	Cell 1 Management Science Model	Cell 2 Carnegie Model
Low	Cell 3 Incremental Decision Process Model	Cell 4 Carnegie and Incremental Decision Process Models

Technical

Knowledge

Source: (Daft, 1989, p.381)

Figure 2. Integration of Decision Models with Contingency
Decision-Making Framework

III. GENERAL DESCRIPTION OF THE OBSERVED WAR GAME

A. PURPOSE

The main purpose of the war game was to explore the command's response to an external environment that was unfamiliar, strategically different, to the group but considered within the realm of possibility. The game restricted itself to the examination of political and military issues; social and economic issues generally were not considered. The group was instructed to focus on the decision-making process, the objectives and critical issues of the game, and war termination goals and strategies. The priorities for each discussion period were given as war termination objectives, specific military objectives to support the war termination objectives, command relationships, and the employment and deployment of forces.

B. FORMAT

The game used a seminar format and played through a scenario that had been previously approved by the theater CINC. The game was played over a three-day period, and a critique was held on the fourth day. Each game day began with briefings and situation updates, and these were followed by periods of discussion. The briefs and discussions lasted for approximately one half of the day. Afternoons were used by the various staffs to execute the actions called for by the mornings decisions and to allow the games controllers to perform assessments of these actions.

The decision-making group was composed of 10 individuals who represented the theater CINC, his subordinate commanders, and a senior controller. This group occupied three sides of a large rectangular table, leaving the fourth side open for visual material and briefers. The seating for the group was determined by protocol and seniority of rank: the individual representing the theater CINC sat at the head of the table and the individuals representing the junior personnel sat at the far end. The game room also contained enough seating to accommodate approximately 40 to 50 additional people and this seating was generally filled by observers, controllers, and the staffs of the individual members of the decision-making group. Located within the room were two video cameras which recorded the events and allowed additional staff and support personnel, located in two separate rooms, to monitor the proceedings.

C. PARTICIPANTS

Numerous people participated in the war game in a variety of capacities. However, for the purpose of this thesis, the term "participants" refers to the members of the decision-making group. The participants were individuals who had been, or were on, active duty and represented the senior levels of the United States military establishment: the senior participant wore four stars, and the junior participant wore one stars. All of the participants had held command at senior levels, and all had combat experience. The educational levels of the participants were fairly comparable: each had attended one or more of the top level military schools, and each held at least one graduate degree from a nonmilitary school. All four of the services were represented, and the time in service

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ranged from approximately 30 to 40 years. The status and leadership relationships within the decision-making group was set by the roles of the participants. The members of the group were familiar with each other, and most had participated, as a group, in a previous war game. The previous game had used the same seminar format but had played a different scenario.

IV. OBSERVATION METHOD

A. VIDEO RECORD

The game had been recorded on VHS cassettes. Two cameras had been mounted in different locations within the game room and this resulted in two sets of tapes. The author chose to work with the set of tapes that provided the best view of the decision-making group. Each set of tapes held the record of 11 hours and 21 minutes worth of events. The tapes contained all of the seminar sessions as well as the final critique held on day four, which lasted two hours, and one hour of the afternoon working sessions between the staffs and the controllers. The seminar sessions occupied a total of eight hours and 21 minutes. This time was used as shown in Table 1.

TABLE 1
USE OF GAME TIME

EVENT	CUM TIME (HOUR:MIN)	% OF TIME
Periods of Discussion	5:12	62.3
Briefs and Situation Updates	1:57	23.3
Breaks	1:12	14.4
Total	8:21	100.0

The author viewed the selected set of tapes a total of three times over a five-day period. The purpose of the first viewing was to get a general impression of the game. During the second viewing the author began identifying and coding decisions. In the third viewing the author verified the coding and performed comparisons between the decisions to ensure that the coding was as consistent as possible. Throughout each of the viewings the author made use of the fast forward and rewind features to observe areas of interest multiple times.

B.   VARIABLES

The variables used to code the observed decisions are based upon decision theory. The majority of these variables were obtained from published research articles on organizational decision making; a few were originated by the author. The variables were intended to provide an initial framework for structuring the author's observations. They are by no means comprehensive and were not intended to provisionally test any predetermined hypotheses. Rather, their purpose was to assist in the generation of hypotheses. The variables, definitions, range of values, and rationale for selection are contained in Appendix A.

C.   CODING METHOD

In performing the coding the author let the complexity of the material determine how much was coded each day and did not follow a set routine that specified the amount of material to be coded within a fixed amount of time.

Free form observations were also made for each decision. These observations were made during the process of coding and were used to record information that the variables could not capture. They included comments, impressions, thoughts, quotes, and comparisons among the decisions. The combination of free form and coded observations were used to describe the observed decisions and provide the basis for the analysis and conclusions.

V. WAR GAME OBSERVATIONS

A. GENERAL

During the course of the war game the author identified 13 decisions that were placed before the CINC and his subordinates and that evolved from the group decision-making process. These decisions were coded and the results, as well as a graphic representation of the decision sequence for each day are contained in Appendix B. The reader is encouraged to refer to Appendix B before continuing with this chapter.

The external environment met the definition of a "high-velocity environment"; an environment where there is a rapid and discontinuous change in the availability and disposition of friendly and hostile forces, technology, and political constraints on the military options, such that the information used by the decision makers is often inaccurate, incomplete, or obsolete. This was especially applicable, since each day of the game was designed to cover the events expected to occur in 15 days of real time. The decision-making environment was calm, professional, and business-like. Participants were attentive and at times forceful, but they seldom raised their voices, and there were no obvious personal differences or animosities. Although no single personality dominated the process, the senior people provided the bulk of discussion and appeared to have the most impact on the process and solutions. All of the participants were involved and, with the exception of the controller, all had a direct interest in the decisions reached.

The procedural norms that were used appeared to be familiar to the participants. In most cases the participants took their lead from the CINC. An individual's ability to clearly articulate his opinion or argument appeared to influence the impact he had on the group. Humor was occasionally apparent, but it seemed to be personality and not situation dependent. Over the three days occupied by the game it was evident that decisions were also being made apart from the group under observation. The group's discussions indicated that decisions were being made by the control team, staffs, and various subgroups. The results of these decisions were evident even if their decision process was not.

B.   NARRATIVE OF OBSERVED DECISIONS

1.   Decision 1

Decision 1 occurred on the first day of the game and concerned the actions that should be taken to deter the likelihood of conflict with the Soviet Union given a particular international situation and set of political constraints. The initial reaction of the group was to fall back upon the existing operational plan for general war with the Soviet's, regardless of the fact that the political constraints rendered the existing plan unfeasible. The first four subordinates to speak recommended the existing operational plan. The rationale expressed by these subordinates was that the Soviet's would see the U.S. begin to implement the war plan and conclude that the U.S. was serious about the particular situation. Giving this impression to the Soviet's would act to deter them from aggressive actions. One subordinate made the following comment: "We have gone through it (the

operational plan) and through it, and that is, in our view, the best deterrence posture we can take....". The group began to consider a different solution only after the controller pointed out that the group was not taking into account the political constraints, and that the existing plan could not be implemented (in total) in the current situation.

After approximately 17 minutes of discussion the group took a break in order to a request additional information from the National Command Authority (NCA) and allow time for the request to be answered. The break was followed by a second period of discussion, and then each subordinate was given the opportunity to present solutions. The courses of action presented were modifications of the existing operational plan and were partial solutions since each subordinate only presented what his command would (as opposed to could or should) do.

This presentation of courses of action by subordinates was followed by rapid consideration of decisions 2, 3, and 4; all in the space of six minutes. The focus of the group then shifted back to the political constraints imposed on the situation and the importance of having the NCA remove the constraints. This led to a third period of discussion on deterrence and what courses of action to take. The discussion at this point varied considerably from the previous discussions. Previous discussions had been primarily about the deployment of forces. The new discussion also included the political consequences of actions, implications of suggested actions on U.S. allies, a questioning of what constitutes deterrence, and what assumptions had been made in executing the guidance received from the NCA. The third discussion period was interrupted for

approximately five minutes when the group recycled back to consider how to implement decision 2. The third discussion period ended when the group decided to take a break.

After the break the subordinates were again asked to present solutions. Again, each subordinate limited his solution to courses of action that his respective command would take. Subordinates did not criticize or critique the solutions of other subordinates, and it appeared that a general consensus had been reached. This final presentation of solutions lasted 15 minutes. The decision reached by the group was to adopt a solution that was a composite of the solutions presented by the subordinates.

2. Decision 2

Decision 2 occurred on the first day of the game and involved whether the CINC should start the Time Phased Force Deployment Data (TPFDD). This topic had been mentioned earlier (in the discussion of the solution for decision 1) when the CINC talked about starting the TPFDD, so there appeared to be a preconceived assumption that it should be started. The decision process took slightly more than one minute and began when the CINC stated that "...want to get TPFDD going, do we not?" There was a general concurrence among the subordinates and no answers to the negative. The decision reached was to start the TPFDD in accordance with the existing operational plan. The decision was brought up again approximately 30 minutes later. This second period of discussion lasted approximately five minutes and never questioned the decision to start the TPFDD; instead, it dealt with modifying the solution to accommodate the political constraints imposed by the conditions of the game.

3. Decision 3

Decision 3 occurred on the first day of the game and dealt with the issue of deploying forces currently assigned to the CINC to another theater, i.e., give up forces. The decision process took one and one-half minutes and there was a general consensus within the group that no forces should be given up.

4. Decision 4

Decision 4 occurred on the first day of the game and concerned the courses of action that should be taken in the event that deterrence efforts failed and conflict occurred between the U.S. and the Soviet Union. The initial period of discussion lasted approximately three minutes. The subject of this discussion was limited to the initial movements of forces, with the assumption that once conflict actually began they would utilize the existing operational plan for general war with the Soviet's. Each subordinate presented the initial moves that his command would make. Subordinates did not criticize or critique the solutions of other subordinates. The final solution adopted by the CINC was a composite of the solutions presented by the subordinates. The decision surfaced again, approximately eight minutes later, when the CINC stated that in the event of war they were going to execute the existing operational plan and asked if there were any comments. There were no comments and the decision was reconfirmed in a matter of 30 seconds.

5. Decision 5

Decision 5 occurred on the second day of the game and involved the execution of limited operations against the Soviet's; specifically, what courses of action should be taken in the conduct of limited operations against the Soviet Union. The decision was in process for approximately one minute when it was interrupted by consideration of decision 6. The interruption occurred because one of the subordinates felt that decision 6 was related and needed resolution before the process could continue.

After decision 6 was reached the decision 5 process resumed. Subordinates were given the opportunity to present the courses of action that their commands would take. There was no general discussion period. The presentations had proceeded for approximately 30 minutes when the process was interrupted by decision 7. This interruption occurred when it became apparent to the subordinates that they had different definitions of what the term "limited operations" meant.

The decision 5 process resumed after decision 7 was reached. The presentation of courses of actions by subordinates took another four minutes to conclude and the group then took a break in order to a request additional information from the NCA and allow time for the request to be answered. After the break the CINC amended the courses of action to incorporate the received information. This took three minutes. The final solution was a composite of the solutions presented by the subordinates as amended by the CINC.

6. Decision 6

Decision 6 occurred on the second day of the game and concerned whether a particular U.S ally should be encouraged to become a co-belligerent, alongside the U.S., in the conflict with the Soviet Union. Additional information was required from the NCA before the decision could be made, but, in the interest of keeping the game moving, assumptions were made, and a decision was reached. The decision process took approximately 13 minutes.

7. Decision 7

Decision 7 occurred on the second day of the game and dealt with the definition of "limited operations"; specifically, what the NCA meant by the term "limited operations". The decision process took approximately five minutes, and the decision reached was to provide recommendations to the NCA and request guidance. The recommendations provided to the NCA would be formatted as potential courses of action and would be subject to NCA screening and approval.

8. Decision 8

Decision 8 occurred on the second day of the game and concerned the actions that should be taken to conduct full scale military operations, as opposed to limited operations, given the constraints of the current situation. Subordinates presented the courses of action that their commands would take, and this presentation was followed by a short period of discussion. Subordinates did not criticize or critique the solutions of other subordinates and there was no discussion prior to the presentation of the courses of

action. The combination of presentations and discussion took 31 minutes. The process was then interrupted by a presentation of information about the Soviet perspective and possible Soviet responses to U.S actions. After the interruption the discussion continued for approximately two minutes before coming to an end. The final solution adopted by the CINC was a composite of the courses of action presented by his subordinates.

9. Decision 9

Decision 9 occurred on the third day of the game and involved the availability of the transportation required to move a particular unit. The decision process was interrupted after approximately one minute when someone questioned the utility of moving the unit, and the group proceeded to decision 10. Subsequent discussions reduced the relevancy of the decision and the group never returned to decision 9.

10. Decision 10

Decision 10 occurred on the third day of the game, and concerned whether the unit mentioned in decision 9 should be deployed or remain in place. Discussion focused on what the main courses of action (employment and deployment of forces) should be for this phase of the conflict. The post-war situation was mentioned briefly, but the execution of the war effort remained the main interest of the group. The decision process was interrupted, after approximately four minutes of discussion, when someone in the group questioned what the overall military strategy was. The group proceeded to decision 11 and never returned to decision 10.

11. Decision 11

Decision 11 occurred on the third day of the game, and concerned the actions that should be taken to prepare for the termination of the conflict on conditions favorable to the U.S. The group discussed different courses of action for approximately 28 minutes before they appeared to arrive at a general consensus. The CINC then took six minutes to summarize the discussion and provide guidance for the preparation of courses of action. After the CINC's guidance the group took a break to allow the staffs time to work on specific courses of action.

Upon returning from the break the CINC again summarized the previous discussion and mentioned the assumptions that the group would have to make in the absence of certain types of information. Subordinates were then given the chance to present their respective courses of action. The ambiguities caused by the lack of information resulted in the inclusion of a number of options in the courses of action. Subordinates did not criticize or critique the solutions of other subordinates. The final solution adopted by the CINC was a composite of the courses of action presented by his subordinates. The final summarization and presentation of courses of action lasted 32 minutes.

12. Decision 12

Decision 12 occurred on the third day of the game and dealt with war termination goals. A list of possible war termination goals was presented to the group by the CINC as a means of starting the discussion. The group did not exhibit the same level of intensity as they did when discussing military actions, and the CINC had to prod

his subordinates to get the discussion moving. The list of goals appeared to be accepted with only minor modifications to the wording, but certain members of the group expressed a desire for more specificity: they appeared to be looking for a conversion of the goals into military objectives. This desire for specificity prompted the group to move on to decision 13 after 15 minutes of discussion. The group never returned to decision 12.

13. Decision 13

Decision 13 occurred on the third day of the game and involved war termination strategies; specifically, what the military strategies should be to support the war termination goals. A list of possible war termination strategies was presented to the group by the CINC as a means of starting the discussion. Participants suggested minor changes to the strategies and appeared more reflective than in previous decisions. The discussion continued for approximately 13 minutes and ended with the implicit acceptance of the presented strategies with minor modifications.

VI. ANALYSIS

A. SELECTIVE BIAS

Selective bias is a phenomenon of cognition. It occurs when a decision maker or decision-making group selectively filters the information that is accepted. A decision-making group that exhibits selective bias:

> ... shows a definite tendency to accept new information from intelligence reports, the testimony of experts, the mass media, and outside critics only when it supports the preferred alternative. The members generally ignore or refute a number of important pieces of nonsupporting information to which they are exposed. (Janis, 1989, p.33)

Selective bias was evident in decisions 1. 2, 4, and 8.

In decision 1, the group wanted to use an existing operational plan even though the game's political constraints rendered the plan unfeasible. The first four participants to speak all recommended the existing plan. The controller drew the group's attention to the constraints, but the group tried to refute them. During the entire game the only time the group questioned the information provided to them was when they questioned the validity of the political constraints. The controller prevailed, and the group was forced to consider courses of action other than the existing operational plan.

In decision 2, the group went back to rework their original solution because it did not take into account the political constraints. The original solution to decision 2 was reached approximately one hour after the group began to work on decision one, and in view of the solution, it is obvious that at that time the group had not accepted the

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constraints. The solution rework occurred approximately one-half hour later. Sometime during the half hour between the original solution and the reworked solution, the group apparently decided that they would have to work within the constraints.

The solution for decision 4 was based upon the anticipated removal of the political constraints in the near future. This assumption was optimistic according to the information available to the group. The group still showed a reluctance to come to grips with an external environment that was different from what was anticipated or practiced. Decision four was reached prior to the rework of the decision 2 solution.

Decisions 1, 2, and 4 all occurred on the first day of the game and were all subjected to the same selective bias, an unwillingness to accept an unanticipated external environment. It took the group up to one and a half hours and required repeated interventions from the controller before they overcame this bias.

The selective bias shown in decision 8 occurred when the group considered one of the courses of action that eventually became a part of the decision 8 solution. This particular course of action was to strike Soviet targets located in a neutral country. Several members of the group pointed out that it was a neutral country, but the rest of the group selectively ignored their comments and concentrated on the military aspects of the strike. Key members of the group had a course of action in mind and filtered out any information that did not support it. They also did not request additional information to confirm the locations of the Soviet targets.

B. UNCERTAINTY

Uncertainty adds emotional stress and complicates decision making. The degree of uncertainty can affect the complexity of the decision process (Mintzberg, Raisinghani, and Theoret, 1976, p.247). Increased stress can impede information processing and can lead to hesitancy in making decisions (George, 1980, pp.27-28, 37). The uncertainty that the group faced can be categorized as (1) uncertainty of present conditions and information and (2) uncertainty of future conditions and events.

The group dealt with the uncertainty of the present by (1) using a directed telescope to obtain the desired information (decisions 9 and 11), (2) requesting information or clarification from the NCA (decisions 1, 5, 6, and 7), or (3) by making assumptions (decisions 4, 6, and 11). The direction provided by the NCA was given in broad general terms and caused the group the most difficulty. Four of the 13 decisions required clarification from the NCA. Indeed, it appeared that the group had as much (or more) difficulty in determining specifically what the NCA wanted as it had in determining what the enemy would do. If the observed decisions are indicative of the decision process that occurs at the theater CINC level in a time of crisis, then a way to speed up the process is for the NCA to provide guidance that is more specific; of course, that may slow down the NCA decision-making process. The trade-off associated with this is a reduction in the CINC's flexibility.

The group dealt with the uncertainty of future by using incremental solutions. Decisions 1, 5, 8 and 11 developed detailed courses of action and all were incremental in nature; they only looked to the immediate future. Courses of action decisions occupied

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80.1% of the group's time, and decisions that were incremental, i.e.,"stop-gap", occupied

82.1% of the group's time. Decision 11 had so much uncertainty associated with it that

the solution included a number of options. This use of incremental solutions is entirely

consistent with the existing literature on decision making. George states:

> The incremental approach recommends itself to leaders when they find it difficult
> to obtain agreement on longer-range objectives and when knowledge and
> information needed to devise more comprehensive plans to achieve them is in any
> case lacking. Under these circumstances, a decisionmaker employing the
> incremental strategy will consider a narrow range of policy alternatives that differ
> only slightly from existing policies and aim at securing marginal rather than
> dramatic improvements. (George, 1980, p.40)

Incrementalism is found in large organizations, both public and private and has been

referred to as a "least-effort" strategy (Janis, 1989, p.40) that enables decision makers to

"muddle through" (Lindbloom, 1959, p.88). This is not to imply that incrementalism is

a defective strategy. The use of incrementalism has some significant advantages: it

reduces the chance of serious mistakes and allows the group to reach a consensus on a

temporarily adequate solution and proceed to something else, especially when information

is lacking. In a high-velocity environment delays can be costly, and the organization may

not be able to catch up if it allows itself to lag behind the changing situation.

Incrementalism also has hidden costs if the group substitutes it for long-range planning

and in doing so overlooks opportunities. Weissinger-Baylon evaluated a week-long war

game that was conducted at the Naval War College and found:

> In the war game, flag decision makers and their staffs responded to intense load
> and time pressure by attending to those choices that were temporarily more
> attractive. This leads to behavior more like a computer time-sharing system than
> like "fire fighting."

Decision makers successively allocate small blocks of time to an important choice. This continues until the choice is resolved or its problems have migrated to other arenas. (Weissinger-Baylon, 1986, p.44)

This is a description of incrementalism. A problem is temporarily solved so that the decision maker can proceed to something else before there is a catastrophic failure. Perhaps this is what it takes to survive at the battle group or fleet level. If so, the training which allows flag officers to succeed in combat may actually impede them when they are placed in policy making or strategic positions. Incremental solutions are not a substitute for policy analysis or strategic planning (George, 1980, p.41).

C. STIMULI FOR DECISIONS

The stimuli, i.e., agent, that prompted the observed decisions were evenly spread among three different types as shown in Table 2. The percentage of time spent in response to the different stimuli was not as evenly spread; the CINC only served as the stimuli 11.8% of the time. This may be an artificiality of the game, since the CINC approved the scenario in advance, and the game was played at his request. What is more interesting is the lack of enemy stimuli. This may be due to the artificialities of the game, or it may be a characteristic of decision making at the CINC level that unless enemy stimuli are sharp and sudden, such as the attack on Pearl Harbor, they are buffered and included in the CINC's perception of the external environment; they become a part of the environment instead of a stimuli. Enemy stimuli act upon the people who are actually facing the enemy, i.e., the subordinate commanders. The primary stimuli to the CINC become the NCA and subordinate commanders.

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TABLE 2
DECISION STIMULI

STIMULI	# DECISIONS	CUM TIME (MIN.SEC)	% OF TIME
CINC	4	34.49	11.8
Staff	0	0.0	0.0
Subordinate Commander	4	88.54	30.3
Above CINC (NCA)	5	169.59	57.9
Enemy	0	0.0	0.0
Other	0	0.0	0.0
Total	13	293.42	100.0

Weissinger-Baylon evaluated a war game conducted by the Naval War College and concluded that "Flag choices tend to be triggered by subordinate commanders, since these officers are closest to information and can effectively identify problems and propose solutions." (Weissinger-Baylon, 1986, p.47) The Naval War College war game was conducted at the naval-force level where the force consisted of a "large battleship and carrier task force in the Indian Ocean as well as amphibious forces, maritime prepositioned forces and aircraft of the rapid deployment joint task force." (Weissinger-Baylon, 1986, p.43) The decision-making environment observed by the author occurred at a higher level of command and does not confirm Weissinger-Baylon's conclusion. In

the environment observed by the author, the subordinate commanders provided the stimuli to four decisions. These decisions occupied only 30.3% of the time spent on decision making. The four stimuli were provided by two of the eight subordinate commanders which means that the other six subordinate commanders were content to let someone else set the course.

D.   DECISION TYPES

The predominate decision type was solution selection. As shown in Table 3, seven decisions followed solution oriented paths. These decisions occupied 82.7% of the group's time. By contrast, problem definition decisions occupied only 3.3% of the group's time.

TABLE 3
DECISION TYPES

DECISION TYPE	# DECISIONS	CUM TIME (MIN.SEC)	% OF TIME
Goal Definition	3	40.13	13.7
Information Collection	1	0.56	0.3
Problem Definition	2	9.36	3.3
Process	0	0.0	0.0
Solution Selection	7	242.57	82.7
Total	13	293.42	100.0

A possible reason for the group's concentration on solution-oriented decisions may lie in what the group considered its task to be. Groups meet for a purpose, and how they perceive their purpose influences how they react. Poole puts forth the argument that:

> At least two distinct definitions of the decision task may occur, each of which implies different ensembles of task components. In the first instance, a group may look on a decision as a "full-fledged" problem which requires all components—problem diagnosis, solution search, testing, and a decision. This interpretation is assumed in most developmental theories, which take problem analysis as a necessary condition of decision-making. In the second instance, a group may look on a decision simply as a stimulus for action on grounds that are already well-understood. This definition implies omission of problem analysis and emphasis on solution development. The second instance is clearly truncated compared to the first, but it does represent a fairly large proportion of the groups encountered in actual situations. (Poole, 1983, p.336)

If the group considered its main purpose to be that of reacting to stimuli within a well understood environment, then this would explain why the group had such an unwillingness to accept changes in that environment, i.e., the political constraints. Poole also suggests:

> It may also be true that groups focusing on solutions are more disorganized, perhaps because they lose sight of their goals or problems. Or it may be that groups attempt more solutions when they are not sure how to proceed. (Poole and Roth, 1989, p.345)

> Premature work on solutions will very likely be undermined by lack of agreement about the problem, requiring the group to retrace its steps and renegotiate solutions. (Poole, 1983, p.336)

If what Poole suggests is true, the process used in arriving at the solution selection decisions should be more disorganized than the other decisions and should be characterized by more delays, disruptions, and reworks of solutions. The author's observations bear this out. The solution selection decisions contained 11 of the 12 delays

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and one of the three disruptions observed. In addition, decisions 1, 2, 4, and 5 all had solution cycles where the group felt it necessary to go back and rework their first solution.

E.   PROBLEM SELECTION

The method by which problems were selected for discussion or resolution was primarily driven by external forces: four out of the first five problems that the group worked on were in response to direction received from the NCA. This may be an artificiality of the game. The CINC approved the game scenario in advance, so an argument could be made that the CINC, not the NCA, selected four out of the first five problems that the group worked on. A total of 57.9% of the group's time and 94.2% of the first day was spent in response to problems originated by the NCA. As shown in Table 4, only one problem (decision 2) was selected because of the time criticality of the problem. This decision was about starting the TPFDD.

Two subordinate commanders provided the stimuli for the three problems selected because of their significance, but the subordinate commanders did not impact the problem selection until day two. This may be due to their perception of the group's purpose. If the subordinate commanders perceived the group's purpose to be one of reacting to stimuli within a well understood environment, then they would be mentally geared towards responding and not towards taking the initiative or adopting a strategic planning role.

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TABLE 4
PROBLEM SELECTION

PROBLEM SELECTION	# DECISIONS	CUM TIME (MIN.SEC)	% OF TIME
Time	1	6.16	2.1
Problem Significance	3	84.19	28.7
Random	4	33.80	11.3
Other (NCA)	5	169.59	57.9
Total	13	293.42	100.0

The author considers it significant that the war termination goals and strategies were not brought up as separate decisions until the end of the last day. These decisions could have affected the overall military strategy and the allocation and employment of forces which began on day one. One of purposes of the game was to focus on war termination goals and strategies, and yet they were not discussed until the CINC brought them up at end of the game. There could be several reasons why this occurred. On the first day of the game one of the participants mentioned that he was assuming that the war termination objectives were the same as in the previous game. If the entire group assumed this, without discussing or challenging the assumption, it would explain why they did not ask what the objectives were at the beginning of the game. It would also help to explain why they concentrated on solution generation. What it does not explain is the difficulty the

group had when it finally discussed what the war termination goals and strategies should be (decisions 12 and 13). Another explanation is that the subordinates were in a reactionary mode. They may have brought with them the war termination goals and strategies from the previous game, but they viewed the purpose of the observed game as one of reacting to a changing military environment. Having to finally decide on war termination goals and strategies for the current environment caused the group to re-evaluate what had been discussed in the previous game. If the environment impacts the war termination goals and strategies, then this re-evaluation should have occurred as soon as the group accepted the fact that the environment of the two games was different. This explanation does not explain why the group had so much difficulty in accepting a new environment.

F.   SOLUTION GENERATION/SELECTION

Decisions 1, 2, 4, and 5 had solution cycles where the group decided to go back and rework their first solution. They had arrived at a solution but subsequent discussion prompted them to consider the situation differently, and they were forced to re-evaluate the original solution.

Nine of the solutions were nonprogrammed, and there is a direct correlation between the length of time it took to make a decision and the solution type (programmed or nonprogrammed). The group spent 96% of their time working on decisions that required nonprogrammed solutions. The courses of action decisions (decisions 1, 4, 5, 8, and 11) consumed 80.1% of the group's time and used a solution generation process that was

different than the other decisions. In each, the subordinate commanders presented courses of action that his individual command would take. The CINC would make minor modifications, comment about coordinating with another subordinate commander, or just listen. The final solution adopted by the group was a composite of the separate courses of action put forth by the subordinate commanders.

For this type of solution generation to work each member of the group must have a clear idea of the organizations objectives, and there must be coordinating mechanisms between the subordinate commanders. The respective staffs of the subordinate commanders conducted analysis and coordination, but this portion of the game was not recorded.

In decisions 1 and 11 there was a period of discussion followed by the subordinate's presentation of individual courses of action. In decisions 1 and 11 this discussion was lengthy. The discussion served to (1) focus the group, (2) arrive at a general consensus of what the objectives were, and (3) provide some measure of coordination between the subordinate commanders. In decisions 4, 5, and 8 there were no initial periods of discussion. Instead, there was a presentation of individual courses of action and then a short period of discussion or "recap". Decision 4 dealt with the courses of action that should be taken in the event deterrence failed. Decision 5 dealt with courses of action for limited operations, and decision 8 dealt with courses of action for full scale operations. By contrast, decision 1 involved deterrence actions, and decision 11 dealt with war termination moves. It is significant that the group felt the need for less

discussion once the shooting started. They were clearly more familiar with what to do during the conflict than they were on how to avoid or terminate a conflict.

This observed process of arriving at composite solutions for courses of actions is entirely consistent with the functional organization of the command (land, sea, and air warfare) and the Composite Warfare Commander (CWC) concept practiced by the Navy. Weissenger-Baylon described the CWC process as:

> Solutions and problems are matched by subordinate commanders themselves. Problem-solution matches are then presented to the flag officer as decisions recommended for his approval. On account of time pressures on the overall commander and his subordinates, as well as communications limitations, neither alternative courses of actions nor justification for the decision are necessarily provided.
> The flag officer and his staff examine the decision recommendation and search for the problem which it will solve: (1) if the problem-solution match appears appropriate, the decision is approved as recommended; (2) if the flag officer's broader view suggests that the proposed problem-solution match is not desireable, an alternative decision will be approved by the flag officer and his staff; and (3) if the flag officer does not respond, the subordinate commander may implement the decision he himself recommended. (Weissinger-Baylon, 1986, pp.47-48)

The CWC concept works well in a naval battle-force environment, but it requires that all participants "play from the same sheet of music." If this concept is employed at the theater CINC level, then special attention should be paid to ensuring that participants have the same objectives and goals. In their work with the micro-computer industry Bourgeois and Eisenhardt found that "In high velocity environments, the more power to make functional strategy decisions is delegated to the functional executives, the better the performance of the firm." (Bourgeois and Eisenhardt, 1988, p.831) If the theater CINC environment is truly a high-velocity environment, then the CWC concept should prove to be beneficial at this level of command.

The group considered anywhere from one to five solutions for each decision and the average number considered was two. Some of the solutions were considered briefly and others were explored in depth. As mentioned above, each courses of action decision developed just one composite solution. The decisions that dealt with war termination goals and strategies also developed just one solution. Although different alternatives and solutions were considered, any decision that required a fairly detailed or complex solution only developed one of the competing solutions to any great depth. The decision process only generated one final solution, not two or more solutions that would each be evaluated at a later date. Mintzberg found the same thing to be true and in 1976 wrote "The hypothesis with the strongest support in our study is that the organization only designs one fully-developed custom-made solution." (Mintzberg, Raininghani, and Theoret, 1976, p.256)

The solution for each decision was selected through a bargaining process. The observed group used a bargaining process for each solution selected even though individual participants displayed judgment for individual choices, and the participants referred to analysis that had been performed by their staffs'. This is to be expected, for while the military is often associated with an autocratic form of decision making, the environment that the group operates in dictates that bargaining would be the preferred method. The CWC concept requires a high degree of coordination and cooperation, and the CINC has subordinates who are strong and relatively independent. Each participant may not agree with each decision, but the bargaining process provides a means for building a consensus and ensures that all have a chance to voice their concerns.

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G. ROLE OF CONTROLLER

The role of the controller was to keep the group from straying too far from the subject at hand and to ensure that the game moved along. In actuality, the controller played the role of an independent counselor who had no vested interest and hence could be impartial. On numerous occasions the controller assumed the role of devil's advocate and helped to avoid groupthink. Groupthink is a pattern of conformity which has been described as "...a collective pattern of defensive avoidance." (Janis, 1977, p.129). Groupthink occurs when members put their affiliation with the group above the purpose of the group and "...avoid raising controversial issues, questioning weak arguments, or calling a halt to soft headed thinking." (Janis, 1977, p.130)

H. PROCEDURES

The procedures used by the group appeared to be well understood by all participants. During the game there were no comments, questions, or discussion about the procedures. The CINC guided the group but did not dominate it, although he could have, for the participants were clearly conscious of the command hierarchy and respective ranks. The CINC would open the floor for general discussion or he would go around the table, as in the courses of action solutions, soliciting solutions or comments from the participants. There was no procedural limit on the number of alternatives or options that could be considered at one time.

In reaching agreement the group used a process called consensus with qualification. Eisenhardt describes it as:

...a two-step process. First, a team attempts to reach consensus by involving everyone. If agreement occurs, the choice is made. However, if consensus is not forthcoming, the CEO and often, the relevant VP make the choice, guided by input from the entire team. (Eisenhardt, 1989, p.562)

This process is useful in resolving all but the most serious conflicts within a group and increases the speed with which group decisions can be made. The use of bargaining and consensus with qualification went a long way toward ensuring that the CINC had the support of his subordinates when a decision was finally made. In a paper on decision development in small groups, Poole observed:

> In general, leadership behavior seems to be more definite and effective under conditions of high consensus. With low consensus a larger number of procedural activities functioning as leadership bids should occur and the group may be less organized and effective. (Poole, 1983, p.338)

If Poole's observation is correct, then the emphasis on consensus suggests a CINC that would be effective in his leadership role.

Decisions 1, 4, 5, 8, and 11 dealt with courses of actions. In decisions 4, 5, and 8 the subordinates presented their respective courses of action before there was any general discussion. These decisions all dealt with conflict with the Soviet's. The grounds for reaching these courses of action must have been well understood for the group didn't feel the need to build a consensus by prior discussion. The procedures used by the group would indicate that the group was much more familiar with what courses to take during a conflict than they were with how to deter or terminate a conflict.

I.   VISION

Vision refers to how far ahead in time the group's participants were thinking and the breadth of their perspective. Were they concentrating exclusively on the days events or were they anticipating events in the future? Did the group look only at the immediate military consequences of their decisions or did they also consider how their decisions would affect the social, political, and economic environments?

During most discussions it appeared that the group would start from a perspective that they felt comfortable with and then expand if the time and conditions permitted. In decision 1, when the group was discussing deterrence moves, it took over one hour before the group began to discuss the political consequences of their military action. In this case, the group started with military moves and eventually broadened their perspective. On day three the group started with a decision on whether a particular unit should be moved, and then quickly escalated their perspective to a discussion of courses of action that should be taken for termination of the war on terms favorable to the U.S. When war termination goals were discussed, it took prodding from the CINC to get the discussion moving. The participants could not instantaneously transition from a discussion of courses of action (decision 11) to a discussion of goals (decision 12). On day two the group's perspective never broadened beyond military considerations. This is seen in their decision to strike a Soviet target in a neutral country with no consideration of the political repercussions. Perhaps conflict, even in a game environment, discourages a broadened perspective. Gladstein and Reilly conducted a study of group decision making under threat and concluded that "It appears accurate to say that an increase in threat not only

led to an increase in internal stress, but also restricted the way in which groups processed information." (Gladstein and Reilly, 1985, p.622) Conflict causes stress, and stress causes a shortened and narrowed perspective where people pay less attention to the side effects and long-range consequences of actions (George, 1980, p.49).

Table 5 shows that the group spent 66.7% of their time working on decisions that would have an almost immediate impact, i.e., short-range decisions. By contrast they spent only 9.4% of their time working on decisions that were long-range in nature. These observations could lead the reader to believe that the group had a relatively short time perception and possibly a narrow perspective. However, if the reader takes a wider perspective of the game, it is possible to reach another conclusion. The group was formulating a consensus for possible courses of actions for a different environment in the realization that a future conflict could occur within that environment. With this in mind the argument can be made that the group exhibited a great deal of vision. They had realized that in a crisis situation "...policy makers are likely to display a narrowing of time perspective along with other characteristic symptoms of cognitive constriction under high stress...." (Janis, 1977, p. 61) and were compensating for this by shifting their decision load to a period when they had more time. Since the CINC was the instigator behind the game, then he would have to be given much of the credit for the depth of vision displayed.

During the game, the group's perspective varied from narrow to broad. After the game, the group had a "hot wash-up" in which they discussed how they did. The ability of some of the participants to detach themselves from the previous days events and

critically evaluate the group's performance showed that given the right conditions they were capable of an taking extremely broad perspective on military, economic, political, and social issues.

TABLE 5
DECISION IMPACT TIME

DECISION IMPACT TIME	# DECISIONS	CUM TIME (MIN.SEC)	% OF TIME
< one week	9	195.50	66.7
< one month	1	3.33	1.1
< six months	1	66.42	22.7
< 12 months	0	0.0	0.0
> 12 months	2	27.37	9.4
Total	13	293.42	100.0

VII. UNDERSTANDING THE THEATER CINC LEVEL ORGANIZATIONAL DECISION PROCESS

A. EXTERNAL ENVIRONMENT

The external environment of the observed game was characterized by a constantly changing situation and can be accurately described as a "high-velocity" environment. Information about the intentions of both the enemy and the NCA was often ambiguous or nonexistent. Information on the disposition and availability of friendly forces was generally accessible, but there was often a time delay. In a real conflict, it is possible that the information on friendly forces would be incomplete and contain a certain amount of error. This characterization of the external environment does not imply that it would always be high-velocity environment, for it is conceivable that it would fluctuate over time. Suffice it say that the external environment of the theater CINC encompasses high-velocity environments.

The time spent in making a decision at the theater CINC level is different than that observed for the junior levels of military command. Weissinger-Baylon recorded several hundred flag-level decisions over a three and one-half day war game that was conducted at a combined battleship and carrier task force level (Weissinger-Baylon, 1986, p.44). Klein observed decision making at the brigade level and recorded 27 decisions over a five hour period. Klein states:

We counted 27 decisions made during the 5 hours, an average of one every 12 minutes. Even this is misleading, since it does not take into account time taken by interruptions and communications. We estimate that about 20 of the decisions took less than 1 minute, five took less than 5 minutes and perhaps only two were examined for more than 5 minutes. (Klein, 1989, p.57)

By contrast, the author observed 13 decisions over a war game that lasted for three days. The theater CINC made fewer decisions, and the decisions took longer than those made at the brigade or naval-force level. The decision process observed at the theater CINC level was clearly different, in the time scale sense, from the decision process recorded for the junior commands. Since the decision process is dependent upon the environment (Fredrickson and Mitchell, 1984, pp.404-405; Bourgeois and Eisenhardt, 1988, pp.816, 832-833) it is possible to draw the conclusion that the decision process varies with the level of command. This is expected, for the junior commands can be viewed as buffers that act to dampen external stimuli before they reach the senior commands. What the theater level command sees is a "smoothed" version of an environment which is greater than the union of the environments of the subordinate commands. If the environment of the junior commands are more volatile than the theater level command, the following hypotheses can be reached:

Hypothesis 1 - The length of the decision process is inversely related to the volatility of the external environment.

When the group was faced with changes to the external environment (constraints) that made it different than expected their initial reaction was to ignore or minimize the

impact of the changes. When they found that they could not ignore the changes they tried to refute them. When this failed, they tried to reverse the changes and restore the environment to the expected. A possible reason for this behavior was that the extent of the environmental changes rendered their existing operational plan unfeasible. They had undoubtedly expended a significant amount of time and effort into generating the existing operational plan, and the group displayed a clear consensus on its utility. This behavior was observed throughout the first day of the game and leads to the following hypotheses:

Hypotheses 2 - When confronted with externally imposed constraints that make a previously agreed upon solution unfeasible, the group's initial response will be to change the constraints rather than change the solution. The group will change the solution only if they fail to change the constraints.

B.   APPLICABILITY OF THEORETICAL DECISION-MAKING MODELS

1.   Goal Consensus

Goal consensus is "...the agreement among managers about which organizational goals to pursue." (Daft, 1989, p.378) A theater level CINC who has functionally oriented subordinate commanders (land, sea, and air warfare) faces a situation where the organization design encourages the subordinate commanders to take a more narrow organizational perspective. The costs associated with a functional organization are (1) poor inter-unit coordination, (2) decisions pile at the top, and (3) a restricted view

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of the whole. (Nadler and Tushman, 1988, p.75) In spite of each participant's military

background, the functional organization does not encourage goal consensus among the

subordinate commanders. The CINC appeared to put a great deal of importance on

consensus, and in view of the organizational structure this is understandable.

For the most part the group seldom mentioned the term "goal": usually they

spoke of objectives or strategies. Still, goals are important in identifying and prioritizing

problems. In his discussion of decision making Daft states:

> When goals are clear and agreed upon, they provide clear standards and
> expectations for performance. When goals are not agreed upon, problem
> identification is uncertain and management attention must be focused on gaining
> agreement about goals and problem priorities. (Daft, 1989, p.379)

If this is correct, then the group's ability to define the problem for each decision should

provide a reasonable indication of goal consensus. Reviewing the problem identification

that took place in each decision process should indicate the level of goal consensus that

existed at the start of the decision process.

In decisions 2, 3, 4, 8, and 9 the group jumped right into solution generation

and never questioned what the problem or objective was. For these decisions the group

appeared to have a high goal consensus, for they had a similar understanding of the

problem and how to solve it so that it furthered their objectives. In decisions 1 and 5 the

group proceeded directly to solution generation and then had to start over when they

realized that they did not have a clear understanding or agreement on the problem.

Before they reworked the solution, they had a period of discussion to clarify the problem.

The goal consensus would have to be considered low for these decisions. In decisions

6, 7, 10, 11, 12, and 13 the group started the decision process with a period of open discussion as a means of clarifying and reaching a consensus on what the problem and objectives were before they proceeded to solution generation. The goal consensus would also have to be considered low for these decisions.

The group looked to the NCA to establish their military goals with one exception, the conduct of full scale military operations (decision 8). Instead of providing measurable goals the NCA gave broad general guidance, and the group had a considerable amount of trouble in translating this guide ce into military actions and objectives. Admiral Train, a former Commander-in-Chief of the Atlantic Command and former Supreme Allied Commander Atlantic, has said:

> It is often very useful if higher authority, such as, for example, the National Command Authority and the people helping them do business, define the problem. For example, in the case of Grenada, Vice Admiral Metcalf had the advantage of having higher authority define the problem very well. As a result of that definition, he was given a clear, concise and understandable political and military objective that he was to pursue. However, in the absence of such clearly stated political objectives, it is very difficult--for the military authorities in particular--to function. A further complication is created when the stated political objective given to the military leadership by the government is not the real political objective but rather a "displayed" political objective, one that will bear the scrutiny of the public as opposed to one that is really in the minds of the duly-elected and accountable leadership." (Train, 1986, p.301)

In decisions 1, 5, 6, and 7 the group went back to the NCA for clarification. During the decision process for decision 11, one of the participants made the following recommendation: "Now in war termination against the Soviet's, I would just outline our war campaign and let the NCA decide...." In the absence of clearly defined objectives from the NCA the military strategy pursued by the group was determined by what was

militarily possible. This is reflected in another comment that a participant made during the same decision (decision 11). He said, "Let's walk through these things (NCA guidance) and then, with the idea that we want to see if these things are feasible, once we decide what it is, the course we want to head in, then we can come back if they are feasible." What the member was suggesting to the rest of the group was that they decide what they were going to do and then come back and see how it compared to the general guidance received from the NCA. The group accepted this suggestion, and that is exactly what they did.

What is emerging from all of this is a picture of how the group responds when forced to accept a new external environment. The new external environment appears to cause a lack of goal consensus within the group. Consequently, if specific goals and military objectives are not provided by the NCA, then the military strategy is dictated by the incremental nature of the generated courses of action. In effect, the military strategy is determined piecemeal, by what is possible, not necessarily what is optimal. The following hypotheses reflects this conclusion.

Hypotheses 3 - When faced with an unanticipated environment, the theater-wide military strategy will be incremental unless the NCA provides specific military goals and objectives.

In their study of strategic decision processes in high-velocity environments, Bourgeois and Eisenhardt reached the conclusion that "In times of rapid change, people

need an anchor for their actions, and clear, explicit goals provide this." (Bourgeois and Eisenhardt, 1988, p.828) They then went on to formulate a hypothesis that "In high velocity environments, the clearer and more explicitly articulated the institutional goal, the better the performance of the firm." (Bourgeois and Eisenhardt, 1988, p.828) In conducting this war game, the CINC was anticipating a possible external environment, exploring military strategies for that environment, and developing a goal consensus within his command.

A comparison of (1) the amount of time required to reach decisions which were initiated in response to stimuli received from the NCA with (2) the guidance provided by the NCA suggests the following:

Hypotheses 4 - For decisions reached in response to stimuli (direction) received from the NCA, the more general the direction received from the NCA the longer the decision process.

2. Technical Knowledge

The theater CINC and his subordinate commanders exhibited a high degree of military skill. This is seen in the solutions generated for the course of action decisions. This degree of military skill is requisite, but not sufficient, for a high state of technical knowledge since the uncertainty of the environment may constrain the application of these skills. The group exhibited a high state of technical knowledge when operating within an environment that was within their sphere of influence, or was familiar to them, and

when the environment remained stable over the time required for the group to achieve their organizational goal.

However, when operating within an environment that involved other forces, such as the Soviet's, the group's understanding of how to achieve their organizational goal was limited, in the time scale sense, by the uncertainty of the environment. When this occured the group exhibited a low state of technical knowledge. The group did not know where all the Soviet ships were, what the exact condition of the Soviet air defenses were, what the weather would be like in the near future, or which of their assets would fail. Their knowledge about external forces was very time dependent and decreased as the time frame extended. The dynamic nature of conflict, where multiple parties try to act upon each other, would preclude a high state of technical knowledge of the environment by any one party.

Daft describes technical knowledge as:

> ...especially important to the problem-solution stage of decision making. When means are well understood, the appropriate alternatives can be identified and calculated with some degree of certainty. When means are poorly understood, potential solutions are ill defined and uncertain. Intuition, judgement, and trial and error become the basis for decisions. (Daft, 1989, p.379)

If technical knowledge is especially important in solution generation, then looking at solutions should provide an indication of the group's technical knowledge for each decision.

Decisions 1, 5, 7, 8, 10, and 11 all had incremental, i.e., "stop-gap", solutions. This type of solution reflects uncertainty and implies a low state of technical knowledge. Decisions 2, 3, 4, 6, and 9 had final solutions. This type of solution reflects a degree of

certainty and implies a high state of technical knowledge. Decisions 12 and 13 present a quandary. Both of these decisions were final but were reached implicitly. Decision 13 involved determining war termination goals, but not how to achieve them. Decision 12 was about war termination strategies. The strategies were more specific than the goals, but again there was no obvious connection between the strategies and the group's knowledge of how to achieve them.

If the desired solution was to arrive at a set of war termination goals and strategies, then the group had a high technical knowledge. However, if the desired solution was to arrive at war termination goals and strategies that were achievable or executable within the games environment, then the group's technical knowledge is questionable since the strategies would be influenced by Soviet actions. The author took the view that the group had a high technical knowledge during decisions 12 and 13. The group knew how to determine war termination goals and strategies, i.e., hold a war game. Also, one of the stated purposes of the game was to arrive at war termination goals and strategies, and the entire game was an exercise to determine possible military strategies.

3. Contingency Decision-Making Framework

The contingency framework says that the management science model of decision making is used when the group has a high goal consensus and high technical knowledge. This describes decisions 2, 3, 4, and 9. The management science model emphasizes the almost exclusive use of analysis to make a decision (Daft, 1989, p.363). In decisions 2, 4, and 9 this analysis was not actually observed but the group's discussions indicated that prior analysis had been done. The group was aware of the

results of this analysis and used the results in making their decision. In decision 3 the group performed no analysis and gave no indication of prior analysis, even though they had a high goal consensus and technical knowledge. Instead, each participant seemed to rely on intuition or judgment. This decision could represent a compressed or "bounded" version of the management science model where, instead of going through a formal analysis, the group responds by using judgment; judgment built up over years of experience.

According to the contingency framework, decisions with a high goal consensus and low technical knowledge should follow the incremental decision process model. This fits the description of decision 8. The incremental decision process model is based upon Mintzberg's discovery that "...major organizational choices are usually a series of small choices that combine to produce the major decision." (Daft, 1989, p.369) Large problems are solved in small steps, often on a trial-and-error basis. In decision 8 the group jumped right into solution generation, but the environmental uncertainty forced an incremental solution.

The contingency framework says that decisions with a high technical knowledge and low goal consensus should conform to the Carnegie model. The Carnegie model emphasizes a coalition building process to reach decisions (Daft, 1989, p.365). This model recognizes that:

> ...organizations are also inherently political systems. Organizations are settings in which various groups have different degrees of power and in which decisions are outcomes of compromise and accommodation among coalitions of different interests. (Nadler and Tushman, 1988, p.81)

Decisions 6, 12, and 13 followed the Carnegie model. In each of these decisions the main emphasis of the decision process was to reach a consensus about both the nature and the importance of the problem and how to define the objectives.

Decisions with a low technical knowledge and low goal consensus should use both the Carnegie model and the incremental decision process model. Decisions 1, 5, 7, 10, and 11 fit this description. In decisions 1, 5, 7, and 11 the group first took time to form a consensus about the problem and then adopted an incremental solution in response to environmental uncertainty. Decision 10 never arrived at a final solution, but the alternatives which were considered were incremental in nature.

As shown in Table 6, four decisions can be classified as using the management science model, six decisions as using the incremental decision process model, and eight decisions as using the Carnegie model. These figures could lead the reader to believe that the decision process used by the theater level CINC is best described by the Carnegie model. This may be incorrect due to the limited number of decisions observed. A correct conclusion is:

1. The theater level CINC uses a combination of decision processes

2. These processes encompass the management science model, the incremental decision process model, and the Carnegie model

3. For this one war game the process depicted in the Carnegie model was observed more frequently than any other process

TABLE 6
OBSERVED ORGANIZATIONAL DECISION-MAKING PROCESSES

ORGANIZATIONAL DECISION-MAKING PROCESS	# DECISIONS WHICH USED PROCESS
Management Science Model	4
Carnegie Model	8
Incremental Decision Process Model	6

The time required to make a decision varied from a low of 56 seconds to a high of 96 minutes and 44 seconds. A review of Table 7 indicates that the decision time is related to the decision process. In actuality, the decision time is related to agreement (goal consensus) and uncertainty (technical knowledge) since the decision process that is used reflects the agreement and uncertainty present during the decision. The observed relationship between decision time, goal consensus, and technical knowledge leads to the following hypotheses:

Hypotheses 5 - The time required to make a decision is related to goal consensus and technical knowledge. Decisions take the least amount of time when there is a high goal consensus and a high technical knowledge. Decisions take longer to

reach when there is a low goal consensus or a low technical knowledge. Decisions

take the longest when both goal consensus and technical knowledge are low.

TABLE 7
COMPARISON OF DECISION PROCESS WITH DECISION TIME

ORGANIZATION DECISION-MAKING PROCESS	# DECISIONS WHICH USED PROCESS	AVERAGE DECISION TIME (MIN.SEC)	% OF TIME
Management Science Model	4	3.50	4.2
Carnegie Model only	3	13.24	13.7
Incremental Decision Process Model only	1	33.22	11.4
Carnegie and Incremental Decision Process Model	5	41.34	70.7
Total	13	NA	100.0

VIII. USING CINC WAR GAMES AS RESEARCH AVENUES: LESSONS LEARNED

A. GAME FORMAT

1. Strengths

The internal environment was largely determined by the seminar format of the war game, the procedures followed, and the personalities of the participants, especially the CINC who sponsored the event and approved the procedures. The seminar format has some distinct benefits for it allows the group to develop social routines and learn how to function as a group in a high-velocity environment. The seminar format also allows the researcher to observe the social routines used by the group. Organizational decision making is a social process and, as Anderson points out, "Organizational decision making, therefore, is not just a product of individual intellectual information processing, but also involves social information processing." (Anderson, 1983, p.202) In addition to the socialization process, the seminar format provides valuable experience for the participants. Schweiger found that increasing a group's experience significantly improved the group's performance in making strategic decisions (Schweiger, Sandberg, and Rechner, 1989, p. 767).

The game format and procedures allowed for an open exchange of information and ideas among the participants. This benefits the researcher by providing increased visibility into the decision process. However, this open exchange is not something that

can be taken for granted. In his discussion of presidential decision making George states that "...relationships within small groups can be structured in a variety of ways and that markedly different interaction patterns are possible." (George, 1980, p.82) He also goes on remarks that "The behavior of groups often differs markedly under different leadership conditions." (George, 1980, p.102)

2. Limitations

The seminar format did introduce some artificialities. Analysis was done by the respective staffs but it was done apart from the decision-making group, either in another room or after the daily seminar session was over. The fact that this work occurred separately made it difficult to identify how much analysis was done (degree and depth) and how much of it was available to the individual members of the decision-making group.

The game had artificial time constraints imposed on the decision processes. Participants knew approximately how long each session would last, and there was a timetable established which dictated how much of the scenario would be covered each day. The amount of time that the group could allocate to any one decision was limited and reduced the time available for other decisions. The recorded decision times represent how the group chose to allocate their time, not the time that it would actually take to reach a similar decision in a real situation.

The controller played an important role in keeping the group focused, especially during the first day. In a real-world situation, he would not be there and the group may spend more of their time on tangents or unrelated topics. Of course, the CINC

could compensate for this by assigning the role of "controller" or "devil's advocate" to someone within the decision-making group.

The participants did not have to live with, or face up to, the consequences of their decisions; after all, it was only a game. This reduces the psychological stress and should impact the group's behavior and decisions (Janis, 1977, pp.46-49). McQuie has noted that people respond differently in games than they do in combat: casualty rates in war games are substantially higher than observed in actual battle. McQuie states:

> War games and simulations employ casualties as an internal criterion for terminating simulated battles. Casualty rates ranging from 15 percent to 30 percent per day are not unusual in big simulations of combat. This extreme level of casualties results in a tempo of combat in the games, however, that has not actually occurred in the past and might not be sustainable in the future, given the limits of human nature.
> The reasons war games generate such high casualty rates, while widely discussed, remain obscure. Perhaps combat simulations do not reproduce the decision to desist from a faltering attack or to withdraw from a hopeless defense This defect, happily, has not been observed in those doing the actual fighting.
> The casualties incurred by losing forces appear to have been fewer than usually envisioned by those of us concerned with either command of troops or analysis of war. (McQuie, 1987, p.34)

This limitation would be seen in any type of war game and would not be restricted to the seminar format. George has identified a similar distinction between research experiments and real-world decision-making groups:

> The emotions aroused among real-world decisionmakers stem from the perceived consequences of the difficult and often distressing choices they must make which may affect themselves and their own individual career prospects as well as the lives of many people; indeed, in foreign-policymaking, the peace of the world may be at stake. Decisions made in laboratory experiments, on the other hand, tend to mean much less to the participating subjects and to be objectively much less consequential in other ways. (George, 1980, pp.82-83)

The format appeared to encourage the use of oral situation updates and briefings. For the researcher, this is a double-edged sword. Oral briefings allow the researcher to determine when the group received certain information and to observe the group's response to the different information sources. They also provides less of an audit trail. Oral communication provides a means of facilitating the exchange of information; however, it does not encourage documentation: "The nature of managerial work introduces a bias in favor of oral channels of information at the expense of documented sources." (Mintzberg, Raisinghai, and Theoret, 1989, p.75) Janis has noted that this reliance on oral briefings is common in top-level executives:

> Top-level executives in government, business, or welfare organizations are likely to turn to one or another of the key members on their staffs to supply a nutshell briefing, and to rely solely on the single channel of information.... (Janis, 1989, p.41)

A "nutshell briefing" is defined as follows: "When facing a complicated policy problem, save time and effort by getting someone who has looked into the issues to tell you what it is all about, 'in a nutshell,' and then decide." (Janis, 1989, p.40)

If a decision-making group is composed of a CINC and his subordinate commanders, then the size of the group is dependent upon the command structure and, to a lesser extent, the physical location of the various subordinate commands which influences the availability of personnel. In this particular case, the size was slightly larger than expected in policy making groups since:

> Most real world decisionmaking groups tend to be quite small--between two and seven members according to one study--and their size tends to be reduced at times of crisis, or when 'crucial choices' have to be made. This is true, for instance, of the foreign-policy groups within the U.S. government that developed plans in

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several recent crises, including Korea (1950), Indochina (1954), Cuba (1962), Vietnam (1965), Cambodia (1970), and the Arab-Israeli conflict of October 1973. (George, 1980, p.83)

The reduction in the size of the decision-making group when crucial decisions are made during conventional, non-crisis, war situations is exemplified by the American decision to reconquer the Philippines during World War II. This was a strategic choice in the war against Japan and was disputed for the better part of a year. The final decision was ultimately made by just three people, President Roosevelt, General McArthur, and Admiral Nimitz (Quin, Mintzberg, and James, 1988, p.149). The relatively large size of the observed decision-making group (10 participants) may have been one of the artificialities of the game. Some of the subordinate commanders had to travel extensive distances to attend, and the author finds it hard to envision that in a time of crisis the CINC would have them spend their time traveling instead of guiding their command's activities. In a crisis, the decision group could be composed of the people readily available with the others being contacted by message or secure phone.

B. OBSERVATION METHODS

1. Video

Using video as a means of data collection has definite advantages. Video provides an independent record that the researcher can view as many times as necessary. The ability to view the data multiple times allows the researcher to concentrate on one aspect at a time without losing the rest of the data. A video record also provides the opportunity to verify previous observations and to correct mistakes. Perhaps the greatest

advantage of video is that it provides a common data base from which multiple researchers can work without destroying the integrity of the data. In their discussion of data collection techniques, Marshall and Rossman mention the following advantages of video data collection:

> Film is particularly valuable for discovery and validation. It documents nonverbal behavior and communication, such as facial expressions and emotions. Film preserves activity and change in original form. It can be used in the future to take advantage of new methods of seeing, analyzing, and understanding the process of change. Film is an aid to the researcher when the nature of what is sought is known but the elements of it cannot be discovered because of the limitations of the human eye. Film allows for the preservation and study of data from nonrecurring, disappearing, or rare events. With films, interpretation of information can be validated by another researcher. Feedback can be obtained on authenticity of interpretation and it can be retaken to correct errors." (Marshall and Rossman, 1989, p.86)

There are also limitations involved in using video for data collection. The quality of the video is dependent upon the expertise of the person(s) doing the recording and, to a lesser extent, the type of event being recorded. The researcher only gets to see what the camera sees: for a viewer it is much like going to a tennis match without being able to move your head after you sit down. Any off-screen events, interactions, or documents are not recorded. Another limitation is that video is capable of providing enough data to overwhelm the researcher and cause him or her to miss "the big picture." (Marshall and Rossman, 1989, p.104)

Video proved to be an excellent means of recording data for the observed war game. Still, the thoroughness of the data could be increased by complementing the video record with the following additional forms of data:

1. On-site observations during the game

2. A documentation package consisting of all game related documents available to the decision-making group

3. Interviews with the gaming facility personnel who planned and conducted the game

2. Coding

a. Applicability of Coding Method

The variables used to code the decision processes are contained in Appendix A. The majority of the variables were obtained from published research articles on organizational decision making; a few were originated by the author. These variables provided a common framework for observing each of the decision processes and were used to distill the data contained in the video record of the war game. Free form observations were also made for each decision process. When these two types of observations, coded and free form, were combined, they provided the picture of the decision processes contained in this thesis.

The coded variables worked reasonably well but warrant modification. Four of the variables proved to have negligible value. This may be due to the seminar format of the game, or it may be peculiar to this particular decision-making group. These four variables are (1) phase, (2) information evaluation, (3) trigger, and (4) number of participants. The author also experienced difficulty in coding the variables of problem, solution, decision type, and impact time.

Problem and solution had possible values of (1) programmed and (2) nonprogrammed. This did not provide enough variety to accurately record how the group viewed the different problems and solutions. If the group was faced with a problem or solution that deviated from the familiar, then the definitions of programmed and nonprogrammed required the variable to be coded as nonprogrammed. However, at times the group still treated the problem or solution as programmed. In these cases, the group did not appear to consider the deviation significant. To accommodate this behavior, the author recommends that the variables of problem and solution have a range of at least four values. Suggested values are (1) very programmed, (2) programmed, (3) nonprogrammed, and (4) very nonprogrammed.

The variable of decision type had values that were not individually defined prior to coding. During coding, this led to ambiguity and subjective interpretation. Clear definitions for each possible value should reduce this subjectivity.

The variable of time impact should be redefined and possibly renamed. All of the decisions required some sort of action in the immediate future, so the argument could be made that they all had an immediate effect. The distinction that provides an indication of the group's vision is whether the decision was geared toward guiding events at a designated time in the future.

b. Other Possible Coding Methods

The coding method that was used originated from decision theory. Argumentation and communication are two other disciplines that may prove useful in understanding decision making at the theater CINC level. The group's emphasis on

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consensus building and bargaining indicate that the framing and communication of arguments would be an important part of the decision process. The author's observations bear this out. Putnam and Geist have noted that "Bargaining is accomplished through arguments, reasoning, and persuasive appeals." (Putnam and Geist, 1985, p.226) In his study of presidential decision making, George makes the comment that "...small informal groups may produce more examples of genuine persuasion and, because the participants know that persuasion is possible, the arguments may be better." (George, 1980, p.86) Coding the communications within a decision-making group could indicate transition points in reasoning and could identify recurring themes or concerns. Coding the group's arguments may provide insight into (1) logic flow, (2) how the group views specific problems and solutions, (3) the impact that various sources of information have on opinions, and (4) relationships between decisions. Equating the logic flow with the decision process could provide additional information about how the group makes decisions.

C. RECOMMENDATIONS FOR THE CONDUCT OF SEMINAR WAR GAMES

1. Topics/Content

The two decisions which gave the group the most difficulty were the decisions on courses of action for war deterrence and war termination (decisions 1 and 11). In the author's opinion, both of these subjects (deterrence and termination) should be emphasized during CINC level war games. Weissinger-Baylon has observed that peak flag-level decision loads occur during period of international tension when "...commanders

and their staffs are stressed by requirements to position their forces for battle, to strike before the enemy and to avoid accidental or premature triggering of a conflict." (Weissinger-Baylon, 1986, p.44) If this is correct, then decisions about courses of action for war deterrence and termination could be made under fairly intense conditions. Janis and George have noted that decision makers are likely to have a reduced time perspective in a crisis situation (Janis, 1977, p.61; George, 1980, p.49). In addition, Gladstein and Reilly have found that "...members will react to external environmental threat by using less information and fewer communication channels and by having less interaction than they would under nonthreatening conditions." (Gladstein and Reilly, 1985, p.622) This restriction in information processing will lead to inferior decisions unless ameliorated by prior planning and crisis training (Nunamaker and others, 1988, p.28). If courses of action for war deterrence and termination gave the group difficulty during a game, then it is quite likely that they will give the group increased difficulty during a real situation. The decision-making group can compensate for this by concentrating on these areas during war games. War games provide the group with the opportunity to plan and practice their response and thereby reduce the likelihood of poor decisions (Nunamaker and others, 1988, p.28).

Two other subjects that, in the author's opinion, should be included in all CINC level war games are war termination goals and strategies. In the observed war game, the war termination goals and strategies were the last two decisions made, even though these decisions could have affected the overall military strategy and the allocation and employment of forces which began on day one. A review of literature on real-world

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decision-making groups indicates that the observed pattern is a common one. Anderson conducted a detailed analysis of archival documents from the Cuban missile crisis. One of his conclusions is that "...the act of making decisions led to the discovery of goals." (Anderson, 1983, p.201) Anderson goes on to say:

> ...the standard description assumes that decision makers identify goals as a first step. This implies that decision making is goal-directed. The goals serve as the benchmark from which alternatives are sought and then evaluated. The evidence from the crisis, however, suggests that goals are discovered throughout the course of making a decision. (Anderson, 1983, p.203)

Weick also found this same pattern to be true. In his discussion of organizations he states:

> This sequence in which actions precede goal definition may well be a more accurate portrait of organizational functioning. The common assertion that goal consensus must occur prior to action obscures the fact that consensus is impossible unless there is something tangible around which it can occur. And the 'something tangible' may well turn out to be actions already completed. Thus it is entirely possible that goal statements are retrospective rather than prospective. (Weick, 1979, p.18)

One way for the theater level CINC to avoid an incremental military strategy during a conflict is to have war termination goals and strategies in place prior to the outbreak of the conflict. A way to accomplish this is by using war games to determine the goals and strategies for potential environments. The time available for any one war game is limited, and the determination of goals and strategies are too important to leave to chance. If war termination goals and strategies are going to be discussed last, then the author recommends that a specific amount of time be reserved for these subjects.

2. Procedures

The only time the group questioned the validity of any of the information provided to them was when they debated the validity of the political constraints during decision 1. In a game situation this may be desired, for the players are supposed to operate within the confines of the game. However, practicing the acceptance of all information may encourage this behavior in nongame situations. Janis has observed that in real-world situations, decision makers will use whatever information is at hand, even though the information comes from sources with varying degrees of credibility (Janis, 1989, pp. 93-94). Often the information is biased in favor of a particular course of action (Janis, 1989, p.41) or in an attempt to distort or withhold bad news (Janis, 1989, p.246). Even if the information is not intentionally biased, it may have critical uncertainties left out, oversimplified, or deemphasized (George, 1980, p.21). Clearly, all information is not of the same value and credibility. The author recommends that:

1. During a war game the participants receive a certain amount of conflicting information, i.e., disinformation

2. The procedures of the game allow the participants to question the validity and timeliness of information received during the course of the game

One of the strengths of the observed game was the open exchange of information and ideas among the decision-making group. While this is dependent upon more than procedures, the procedures that are used can certainly encourage this openness. In a military decision-making group, which relies upon consensus and practices the CWC concept, this may be especially important. George suggests "...that when committees are

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formed from members of a formal authority structure (such as a government), the members' ranks in the larger system may well affect their rank in the committee in a way which is not beneficial to the decision." (George, 1980, p.88) The theater level CINC and his subordinate commanders are not a committee, but procedures which do not compensate for the impact of the different ranks may restrict the flow of ideas. Likewise, procedures which don't reduce the impact of a dominating leader (not the case in the observed war game) may effect the quality of the decisions:

> ...an assertive leader may promote a feeling among group members that they are only fact-gatherers and expediters and that all value questions are his sole prerogative. This may lead not merely to a diffusion of responsibility but to its displacement upon the executive; thus, members may vest their consciences in the leader, ignoring the moral or ethical considerations pertinent to the policy options being discussed. (George, 1980, p.101)

> Successful committees are also associated with leaders who... do not control heavily on content issues. Content suggestions and evaluations should be broadly (though not equally) distributed among the other members. If a leader overcontrols on content, he is likely to produce conflict or superficial agreement and inhibition. (George, 1980, p.101)

Superficial agreement may prove detrimental during the execution of a decision. Janis has found that:

> Although leaders can exercise a great deal of power and influence, they certainly do not always get their own way. In fact, subordinates fairly often do not implement policy decisions in the way the leaders want...." (Janis, 1989, p.266)

Janis points out that this can be reduced through persuasion and by overcoming objections (Janis, 1989, p.266). Decision-making procedures which actively involve all participants and encourage open discussion and exchange of ideas will certainly go a long way

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towards reducing both superficial agreement and inhibition and the inherent problems which accompany them.

D.   CONTINGENCY DECISION-MAKING FRAMEWORK

The contingency decision-making framework characterizes decisions by the level of uncertainty (high or low) associated with the problem and solution (Figure 1). Decisions can also be categorized as programmed and nonprogrammed. Programmed refers to decisions that are repetitive or well defined and have a low uncertainty associated with them. Nonprogrammed refers to decisions that are novel or ill defined and have a high uncertainty associated with them. (Daft, 1989, p.356)

Applying the terms of programmed and nonprogrammed to problems and solutions would appear to be a logical extension. Programmed problems or solutions would be repetitive or well defined and reflect low uncertainty.   Likewise, nonprogrammed problems or solutions would be nonrepetitive or ill defined and reflect high uncertainty. The terms of programmed and nonprogrammed should be interchangeable with the terms of high and low certainty within the contingency decision-making framework. However, when this occurs there are inconsistencies between the contingency decision-making framework and the author's observations.   Decision 8 is a good example of this inconsistency.

In decision 8, the group was working with an nonprogrammed problem, which would indicate high uncertainty, and yet they had a definite goal consensus about what to do. The solution was incremental, i.e., "stop-gap", which reflects low technical

knowledge. The framework indicates that decisions with a high goal consensus and low technical knowledge will use the incremental decision process model; this agrees with the observations. However, both the problem and the solution were nonprogrammed. According to the framework, the decision process for decisions that have nonprogrammed problems and solutions should have been a combination of the Carnegie and incremental decision process models (Figure 2). This disagrees with the observations. Three obvious possibilities for this inconsistency are (1) coding errors, (2) incorrect definitions, (i.e., nonprogrammed does not reflect high uncertainty), or (3) disparities between the "real world" and the framework.

The framework consists of a two-by-two matrix. Goal consensus and technical knowledge are either high or low, and problems and solutions have either a high or low uncertainty. If the terms of programmed and nonprogrammed are used, then problems and solutions are either programmed or nonprogrammed. This appears to be a definite limitation of the framework. The author's observations of the war game indicate that there are varying degrees of uncertainty, and two values do not provide enough variety to accurately document the level of uncertainty. Somewhere between the two extremes the group crosses thresholds that determines how the group views the problem or solution. These thresholds would undoubtedly vary according to (1) the group's general experience level and (2) the group's experience with each particular problem or solution. The two-by-two matrix is good for conceptualizing how agreement and uncertainty affect the decision process, but it does not offer enough granularity to represent the real world.

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A four-by-four matrix is offered as one means of increasing the accuracy of the framework. This matrix size represents a trade-off between coding difficulty and granularity. Goal consensus and technical knowledge could have one of four values. Suggested values are (1) very high, (2) high, (3) low, or (4) very low. Problems and solutions could have one of four values: (1) very low uncertainty, (2) low uncertainty, (3) high uncertainty, or (4) very high uncertainty. Figure 3 shows how this matrix would look with the terms of programmed and nonprogrammed used in place of low and high uncertainty. The management science model would still be in the upper left hand corner (cell 1) but would now be associated with very programmed problems and solutions or with very high goal consensus and technical knowledge. The decision process associated with all but the corner cells would vary according to the group and circumstances. This added granularity would allow the contingency decision-making framework to represent what was observed and at the same time incorporate the commonly used terms of programmed and nonprogrammed.

Goal   Consensus

		Very High	High	Low	Very Low
Very High		Cell 1 Problem: very programmed Solution: very programmed Management Science Model	Cell 2 Problem: programmed Solution: very programmed	Cell 3 Problem: nonprogrammed Solution: very programmed	Cell 4 Problem: very nonprogrammed Solution: very programmed Carnegie Model
High		Cell 5 Problem: very programmed Solution: programmed	Cell 6 Problem: programmed Solution: programmed	Cell 7 Problem: nonprogrammed Solution: programmed	Cell 8 Problem: very nonprogrammed Solution: programmed
Low		Cell 9 Problem: very programmed Solution: nonprogrammed	Cell 10 Problem: programmed Solution: nonprogrammed	Cell 11 Problem: nonprogrammed Solution: nonprogrammed	Cell 12 Problem: very programmed Solution: nonprogrammed
Very Low		Cell 13 Problem: very programmed Solution: very nonprogrammed Incremental Decision Process Model	Cell 14 Problem: programmed Solution: very nonprogrammed	Cell 15 Problem: nonprogrammed Solution: very nonprogrammed	Cell 16 Problem: very nonprogrammed Solution: very nonprogrammed Incremental and Carnegie Decision Process Models

Technical

Knowledge

Figure 3. Expanded Contingency Decision-Making Framework

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IX. CONCLUSIONS

A. LIMITATIONS

The reader should keep in mind that this thesis describes the decisions made during one particular war game. The observations pertain to a single scenario, set of players, game format, and command relationships. To say that the conclusions and hypotheses drawn from these observations are applicable to all theater CINCs would be presumptuous and incorrect. This thesis does not provide a complete understanding of the organizational decision process at the theater CINC level. What it does provide is a partial understanding and a point of departure for future studies. All conclusions and hypotheses contained in this theses refer to the theater CINC level of command and need to be empirically tested in future studies.

B. GENERAL

The theater CINC operates in an external environment that encompasses "high-velocity" environments; environments which are characterized by constantly changing situations. Conducting a seminar-format war game allows the CINC and his subordinate commanders (the observed decision-making group) to develop social routines and learn how to function as a group, within a high-velocity environment. The seminar-format war game also serves to familiarize the group with potential external environments, and enables them to shift their decision load to a period when they have more time and are

under less stress. The familiarization process allows the CINC and his subordinate commanders to build a consensus on goals, strategies, and potential courses of action. The decision process which occurs at the theater CINC level is different, in the time sense, from junior levels of command. The theater CINC is called upon to make fewer decisions within the same time period as the junior commands and therefore has more time available for each decision.

C.   GOAL CONSENSUS

The functional organization of the command places a great deal of importance on goal consensus. The theater CINC and his subordinate commanders initially display a low goal consensus for unfamiliar problems and a high goal consensus for familiar problems. The group reaches a goal consensus for unfamiliar problems by having an open discussion that continues until a general consensus emerges. This discussion ensures that all have an opportunity to voice their concerns and encourages coordination and cooperation between the subordinate commanders. The CINC uses consensus with qualification, a technique which is useful in resolving all but the most serious conflicts within a group and increases the speed with which decisions can be made.

The theater CINC and his subordinates are familiar with the situation of full scale conflict with the Soviet Union and consequently have a high goal consensus when they are faced with this situation. When faced with deciding war deterrence or war termination actions for an unfamiliar external environment, the group initially displays a low goal consensus and looks to the NCA to establish the military goals. In the absence

of specific military goals and objectives from the NCA, the group develops their own consensus on military objjectives and adopts an incremental military strategy.

D. TECHNICAL KNOWLEDGE

The theater CINC and his subordinate commanders have a high degree of military skills. This is requisite, but not sufficient, for a high state of technical knowledge, for the uncertainty of the environment may constrain the application of these skills. The group exhibits a high state of technical knowledge when operating within an environment that is within their sphere of influence, or which is familiar to them, and when the environment remains stable over the time required for the group to achieve their organizational goal. However, when operating within an environment that involves other forces, such as the Soviet's, the group's understanding of how to achieve their organizational goal is limited, in the time scale sense, by the uncertainty of the environment. When this type of environment occurs the group exhibits a low state of technical knowledge. Solutions are selected through a bargaining process, and the group uses incremental solutions to compensate for uncertainty in the environment. When confronted with externally imposed constraints that make a previously agreed upon solution unfeasible, the group's initial response is to change the constraints rather than change the solution. The group will change the solution only if they fail to change the constraints.

E. APPLICABLE ORGANIZATIONAL MODELS OF DECISION MAKING

The theater level CINC uses a combination of decision processes. These processes include:

1. The management science model

2. The Carnegie model

3. The incremental decision process model

4. A composite process which is a sequential combination of the Carnegie model and the incremental decision process

5. A "bounded" management science model where judgment is used in place of analysis

The process characterized by the Carnegie model is used more frequently than any other process.

The time required to make a decision is related to goal consensus and to technical knowledge. Decisions take the least amount of time when there is a high goal consensus and a high state of technical knowledge, and these conditions lead to the decision process depicted by the management science model. Decisions take longer to reach when there is a low goal consensus or a low state of technical knowledge. Decisions take the longest when both goal consensus and technical knowledge are low, and the resulting decision process can be characterized by a composite of the Carnegie and the incremental decision process models.

F. RESEARCH UTILITY OF VIDEO OF WAR GAMES

Video records of theater level CINC war games are valuable sources of data on organizational decision making at this generally unexplored level of command. To date, much of the research done on military decision making has been focused on decision making by individuals at levels of command that are junior to the theater CINC. Theater level war games provide a prime avenue of research for exploring the organizational decision process that occurs at the theater CINC level of command, and a video record increases the utility of this research approach.

Video records of war games provide copious amounts of auditable data from which multiple researchers can work without contaminating or destroying the integrity of the data. Even so, these video records have their limitation. They only capture what is in front of the camera and would be more useful if complimented by additional forms of data, specifically, on site observations, documentation, and interviews. The video record also reflects all of the limitations and artificialities of the game format, and this should be taken into account in any research.

G. ROLE OF THE CINC IN SETTING CONFLICT GOALS AND STRATEGIES

The theater CINC plays a vital role in determining the theater wide military goals and strategies during a war or conflict. In the author's opinion, if the theater CINC does not determine the goals and strategies prior to the outbreak of the conflict, they quite likely will not be determined until after the fact. Subordinate commanders who are functionally organized (land, sea, and air warfare) are apt to take a restricted view, and

decisions are going to migrate to the CINC level (Nadler and Tushman, 1988, p.75). In a crisis this condition is aggravated as individual time perspectives constrict (Janis, 1977, p.61), and the decision-making group increasingly relies upon the leader (CINC) for direction (George, 1980, p.102). When faced with an unanticipated external environment, the decision-making group initially exhibits a low goal consensus and looks to the next level of command, in this case the NCA, to establish military goals and strategies. However, Anderson and Weick have found that organizational goals are often discovered retrospectively, through *post facto* actions and decisions (Anderson, 1983, p.201; Weick, 1979, p.18). In the absence of an existing set of military goals and strategies, the implemented military strategy is incremental, based upon what is possible not what is optimal. The way to provide a coherent military strategy is to have a strategy in place before the outbreak of hostilities; this can be done by a CINC through war games. The establishment of goals and strategies prior to the outbreak of a conflict is perhaps one of the more significant contributions that a theater level CINC can make.

APPENDIX A

DEFINITIONS, DECISION VARIABLES, AND CODING SHEET

A. DEFINITIONS

The domain of this study is the organizational decision-making process that occurs at the theater CINC level of command during times of conflict or war. Definitions applicable to the domain of study are given below.

1. **DECISION** - A conclusion reached by the members of the decision-making group, implicitly or explicitly, that involves a strategic issue and is about something that the group can act upon or influence.

2. **DECISION PROCESS** - "...a set of actions and dynamic factors that begins with the identification of a stimulus for action and ends with the specific commitment to action." (Mintzberg, Raisinghani, and Theoret, 1976, p.246)

3. **GROUP** - Two or more people.

4. **HIGH-VELOCITY ENVIRONMENT** - An environment where there is a rapid and discontinuous change in the availability and disposition of friendly and hostile forces, technology, and political constraints on the military options, such that the information used by the decision makers is often inaccurate, incomplete, or obsolete.

5. **STRATEGIC ISSUE** - An issue that has a scope and content capable of affecting each of the subordinate commanders and their commands as well as the theater command.

B. DECISION VARIABLES

The following variables were used to provide an initial framework for structuring observations of the organizational decision processes used at the theater CINC level of command. These variables are based upon decision theory. The majority were obtained from published research articles on organizational decision making; a few were originated by the author.

1. **CONTROL OF PROCESS BY CINC** - Whether the CINC exercised strict control over the group decision process. Possible values were: yes, no, or combination. A yes value was indicative of a very structured hierarchy in which the CINC indicated who may speak, or, where the members of the group had to be acknowledged by the CINC before they could speak. A no value was indicative of a loosely structured hierarchy in which each member of the group felt free to participate, and there was spontaneous interaction among the members. Combination was when the control of the process varied between yes and no values. Poole has related a preference for procedural order to low group consensus (Poole, 1983, p.338).

2. **DECISION IMPACT TIME** - The time before the effect of the decision was felt within the command. Possible values for this variable were one week or less, one month or less, six months or less, 12 months or less, or more than 12 months. The coding of this variable was intended to provide an indication of how far ahead, in time, the group thought.

3. **DECISION REACHED** - Whether a decision was actually reached by the decision-making group. Possible values for this variable were explicit, implicit, or no.

Explicit meant that the group openly arrived at a decision. Implicit meant that the group arrived at a decision even though it was not openly expressed as such. No meant that the group never reached a solution. This variable was coded to identify (1) the decision processes which ended without reaching a decision or (2) the means by which the decision was reached.

4. **DECISION RESOLUTION** - Whether the decision was final or temporary. Possible values for this variable were final or stop-gap. The coding of this variable was intended to identify whether the group used incremental solutions.

5. **DECISION SUBJECT** - The topic of the decision. This variable had no set range of values.

6. **DECISION TYPE** - The general decision category. Possible values were information collection, goal definition, problem definition, solution selection, or process oriented. This variable was used to segregate the observed decisions into different categories.

7. **DELAYS** - A type of breakpoint in the decision process "...when the group cycles back to repeat or rework previously a problematic issue or to adapt to newly discovered contingencies." (Poole, 1989, pp.328-329) This variable had a numeric value which indicated the number of observed delays in the decision process. Poole relates delays to task complexity and group consensus (Poole, 1983, p.339; Poole and Roth, 1989, p.329).

8. **DISRUPTIONS** - A type of breakpoint in the decision process, "...when a major conflict halts the group's progress, or when failures cause the group to reconsider

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its work" (Poole, 1989, p.329). This variable had a numeric value which indicated the number of observed disruptions in the decision process. Poole relates disruptions to task difficulty and group consensus (Poole, 1983, p.339; Poole and Roth, 1989, p.329).

9. **EVALUATION OF INFORMATION** - The effort that the group, or any member of the group, made to evaluates the information that was available before using the information in the decision process. Possible values for this variable were source questioned, validity questioned, none evident, or other. O'Reilly points out that unlike laboratory data, real-world data is often ambiguous and may have varying degrees of credibility (O'Reilly, Chatman, and Anderson, 1987, p.609). Janis suggests that decision makers often fail to consider this fact (Janis, 1989, pp.93-94). The coding of this variable was intended to identify whether the group questioned available information.

10. **EXECUTION TRIGGERS** - A date, event, or set of circumstances that was used to release or activate the implementation of a decision. For instance; if fired upon you are to return fire. Possible values were yes or no. Bourgeois and Eisenhardt have related the use of execution triggers to performance in high velocity environments (Bourgeois and Eisenhardt, 1988, p.829).

11. **INFORMATION COLLECTION** - An effort by the group to obtain information to use in the decision process. Possible values were none, normal, or directed telescope. Normal referred to all information that came to the group on a regular basis, without using special requests. A directed telescope referred to "... cutting through established channels and directly gathering the information ... needed...." (Van Creveld, 1985, p.75). This term referred to obtaining information from subordinate commands or

units. None implied that the group made no effort to collect additional information during the decision-making process. Eisenhardt suggests that fast decision makers use more information than slow decision makers (Eisenhardt, 1989, p.544) and that the use of real-time information increases the speed of the decision process (Eisenhardt, 1989, p.549).

12. **NUMBER OF PARTICIPANTS** - The number of the decision-making group who participated in the decision process. This variable had a numeric value and was coded to determine if the decision-making process was dominated by a limited number of group members.

13. **NUMBER OF SOLUTIONS** - The number of solutions that were considered by the group during the decision process. This variable had a numeric value. Eisenhardt suggests that faster decisions are associated with more alternatives (solutions) (Eisenhardt, 1989, pp.555-556). Mintzberg states that organizations will only design one solution if it is custom made (Mintzberg, Raisinghani, and Theoret, 1976, p.256).

14. **PHASE OF THE GAME** - The phase of the game within which each of the observed decisions occurred. Possible values for this variable were pre-conflict, conflict, or post-conflict. Pre-conflict were all decisions which occurred prior to the outbreak or declaration of hostilities (exchange of rounds). Conflict referred to all decisions that took place between the outbreak of hostilities and the cessation of hostilities. Post-conflict referred to all decisions that occurred after the cessation of hostilities. This variable was coded to determine if there was a relationship between decision process and phase.

15. **PROBLEM** - A question or situation that presented doubt, perplexity, or difficulty. Possible values were programmed or nonprogrammed. Programmed referred

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to problems that were repetitive or well defined. Nonprogrammed referred to problems that were unique, noncommon, or ill defined. Decision theory indicates that the uncertainty associated with a problem impacts the decision process used by a decision-making group (Daft, 1989, pp.379-383).

16. **PROBLEM SELECTION** - The process by which problems were selected for discussion or solution. Possible values for this variable were time ranking, problem significance ranking, random, or other. This variable was coded to determine whether a consistent process was used to decide the next focus of the group or whether the problem selection process was dependent upon another variable.

17. **SOLUTION** - A possible answer to the problem, one possible course of action. Possible values were programmed or nonprogrammed. Programmed referred to solutions that were repetitive or well defined. Nonprogrammed referred to solutions that were unique, noncommon, or ill defined. Decision theory indicates that the uncertainty associated with a solution impacts the decision process used by a decision-making group (Daft, 1989, pp.379-383).

18. **SOLUTION SELECTION** - The method by which the selected solution was arrived at. Possible values were judgment, analysis, or bargaining. Judgment was defined as where "...one individual makes a choice in his own mind with procedures that he does not, perhaps cannot, explain;...." (Mintzberg, Raisinghani, and Theoret, 1976, p.258). Analysis was where factual evaluation was carried out. Bargaining was where "...selection is made by a group of decision makers with conflicting goal systems, each exercising judgement...." (Mintzberg, Raisinghani, and Theoret, 1976, p.258). This

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variable was coded to (1) determine whether the group used analysis and (2) to provide visibility into the degree of emphasis which the group placed upon consensus.

19. **SOURCE OF SOLUTION(S)** - The originator or presenter of solutions during the decision process. Possible values were CINC, Subordinate Commander, Standing Operating Procedures (SOP), or other. This variable could have multiple values for each decision. This variable was used to identify if the group relied upon one or multiple sources for solutions.

20. **SPEAKING PATTERN** - The sequence in which the group members spoke during the decision process. Possible values were random or sequential. Random referred to a speaking pattern among the group that varied and had no set pattern. Sequential refers to a speaking pattern that was structured, i.e., participants spoke in a prescribed order. The speaking pattern was coded to provide insight into the procedures used by the group.

21. **STIMULI** - The agent, action, or state that evoked the decision. Possible values were Internal (CINC, staff, subordinate commanders) or External (above CINC, enemy, other). Coding the stimuli provided another means of categorizing the decisions and provided visibility into whether the group was initiating the decisions or responding to external influences.

22. **TIME** - The amount of time it took to complete the decision process. The time required to make a decision is dependent upon many of the other variables and is commonly used in decision research.

C. CODING FORM

<u>Choice #</u>   <u>Tape #</u>   <u>Time Ref #</u>   <u>Day of Game</u>

<u>Phase</u>
Pre-Conflict
Conflict
Post-Conflict

<u>Decision</u>
(subject)

<u>Time</u>

<u>Stimuli</u>
Internal
      CINC
      Staff
      Subordinate Commander
External
      Above CINC
      Enemy
      Other

<u>Decision Type</u>
Info collection
Goal definition
Problem definition
Solution selection
Process

<u>Decision Resolution</u>
Stop-gap
Final

98

Info Collection
None
Normal
Directed telescope

Evaluation of Info
Source questioned
Validity questioned
Other
None evident

Problem
Programmed
Nonprogrammed

Problem Selection Process
Time ranking
Problem significance ranking
Random
Other

Solutions Considered
(number)

Solutions
Programmed
Nonprogrammed

Source of Solutions
CINC
Subordinate Commander(s)
SOP
Other

Method of Source Selection
Judgment
Analysis
Bargaining

Execution Trigger
Yes
No

Decision Impact Time
< one week
< one month
< six months
< 12 months
> 12 months

Delays
(number)

Disruptions
(number)

Control of Process by CINC
Yes
No
Combination

Speaking Pattern
Random
Sequential
Combination

Number of Participants
(number)

<u>Decision Reached</u>
Explicit
Implicit
No

TABLE 8
DATA

DECISION	PHASE	SUBJECT	TIME (min.sec)	STIMULI	DECISION TYPE	DECISION RESOLUTION	INFORMATION COLLECTION
1	Pre-conflict	COA to deter conflict	96.44	Above CINC (NCA)	Solution selection	Stop-gap	Normal, NCA
2	Pre-conflict	Start TPFDD	6.16	CINC	Solution selection	Final	None
3	Pre-conflict	Deploy forces out of theater	1.33	Above CINC (NCA)	Solution selection	Final	None
4	Pre-conflict	COA should conflict occur	3.33	Above CINC (NCA)	Solution selection	Final	None
5	Conflict	COA for limited ops	34.47	Above CINC (NCA)	Solution selection	Stop-gap	Normal, NCA
6	Conflict	Co-belligerent ally	12.36	Sub Cmdr	Goal definition	Final	NCA
7	Conflict	NCA def of limited ops	4.35	Sub Cmdr	Problem definition	Stop-gap	NCA
8	Conflict	COA for full scale ops	33.22	Above CINC (NCA)	Solution selection	Stop-gap	Normal
9	Conflict	Lift to deploy unit X	0.56	CINC	Information collection	Final	Dir telescope
10	Conflict	Should unit X be deployed	5.01	Sub Cmdr	Problem definition	Stop-gap	None
11	Conflict	COA for favorable end of conflict	66.42	Sub Cmdr	Solution selection	Stop-gap	Normal, dir telescope
12	Conflict	War termination goals	14.45	CINC	Goal definition	Final	None
13	Conflict	War termination strategies	12.52	CINC	Goal definition	Final	None

TABLE 8
(CONTINUED)

DECISION	INFORMATION EVALUATION	PROBLEM	PROBLEM SELECTION	# SOLUTIONS	SOLUTION	SOLUTION SOURCE	SOLUTION SELECTION
1	Validity	Nonprogrammed	Other (NCA)	2	Nonprogrammed	CINC, SOP, Sub Cmdr	Bargaining
2	None	Programmed	Time	2	Programmed	CINC, SOP	Bargaining
3	None	Programmed	Other (NCA)	1	Programmed	CINC	Bargaining
4	None	Programmed	Other (NCA)	1	Programmed	CINC, SOP	Bargaining
5	None	Nonprogrammed	Other (NCA)	1	Nonprogrammed	CINC, Sub Cmdr	Bargaining
6	None	Nonprogrammed	Problem significance	2	Nonprogrammed	CINC, Sub Cmdr	Bargaining
7	None	Nonprogrammed	Random	2	Nonprogrammed	Sub Cmdr, other	Bargaining
8	None	Nonprogrammed	Other (NCA)	1	Nonprogrammed	CINC, Sub Cmdr	Bargaining
9	None	Programmed	Random	1	Programmed	Sub Cmdr	NA
10	None	Nonprogrammed	Problem significance	5	Nonprogrammed	Sub Cmdr	NA
11	None	Nonprogrammed	Problem significance	3	Nonprogrammed	CINC, Sub Cmdr	Bargaining
12	None	Nonprogrammed	Random	1	Nonprogrammed	CINC	Bargaining
13	None	Nonprogrammed	Random	1	Nonprogrammed	CINC	Bargaining

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TABLE 8
(CONTINUED)

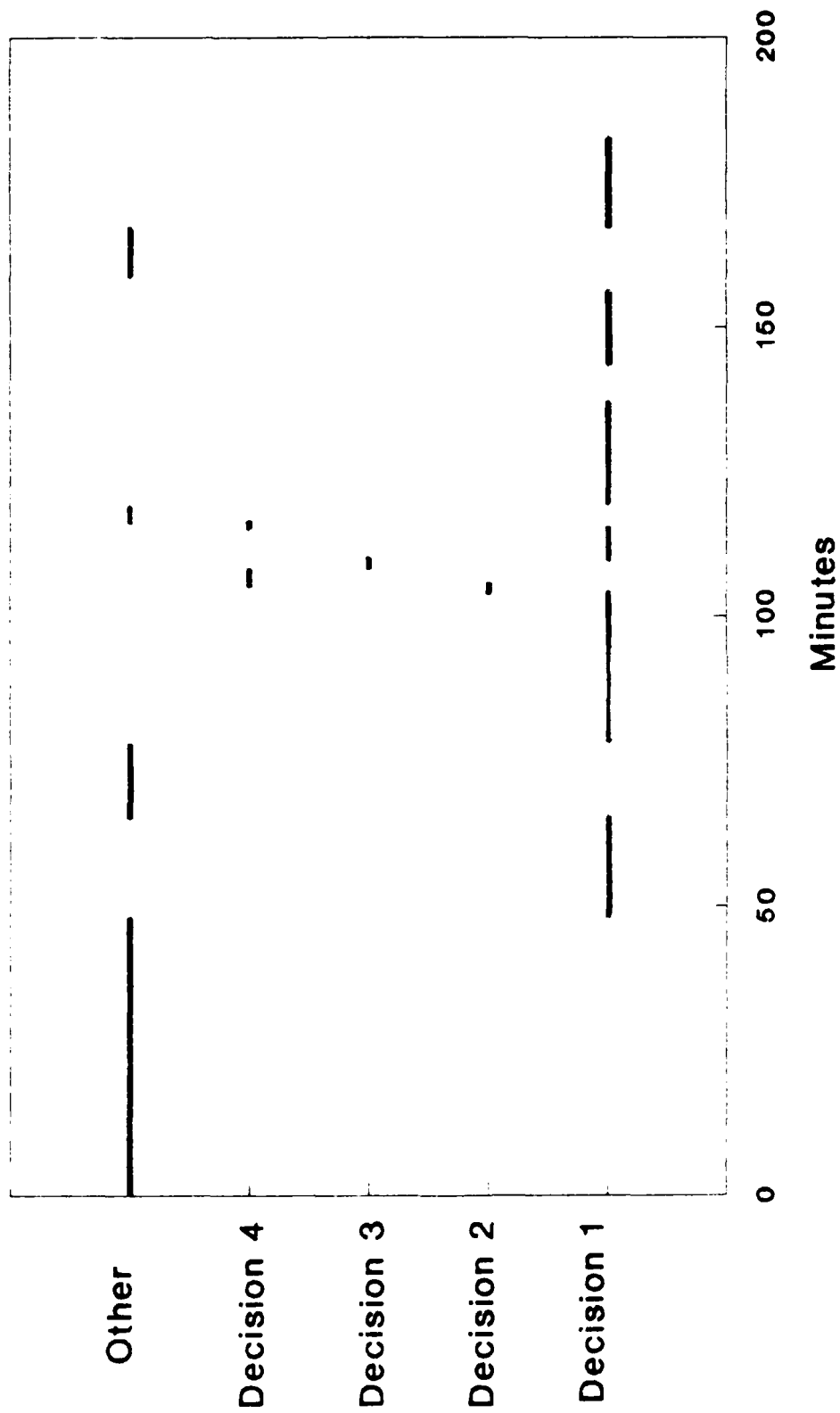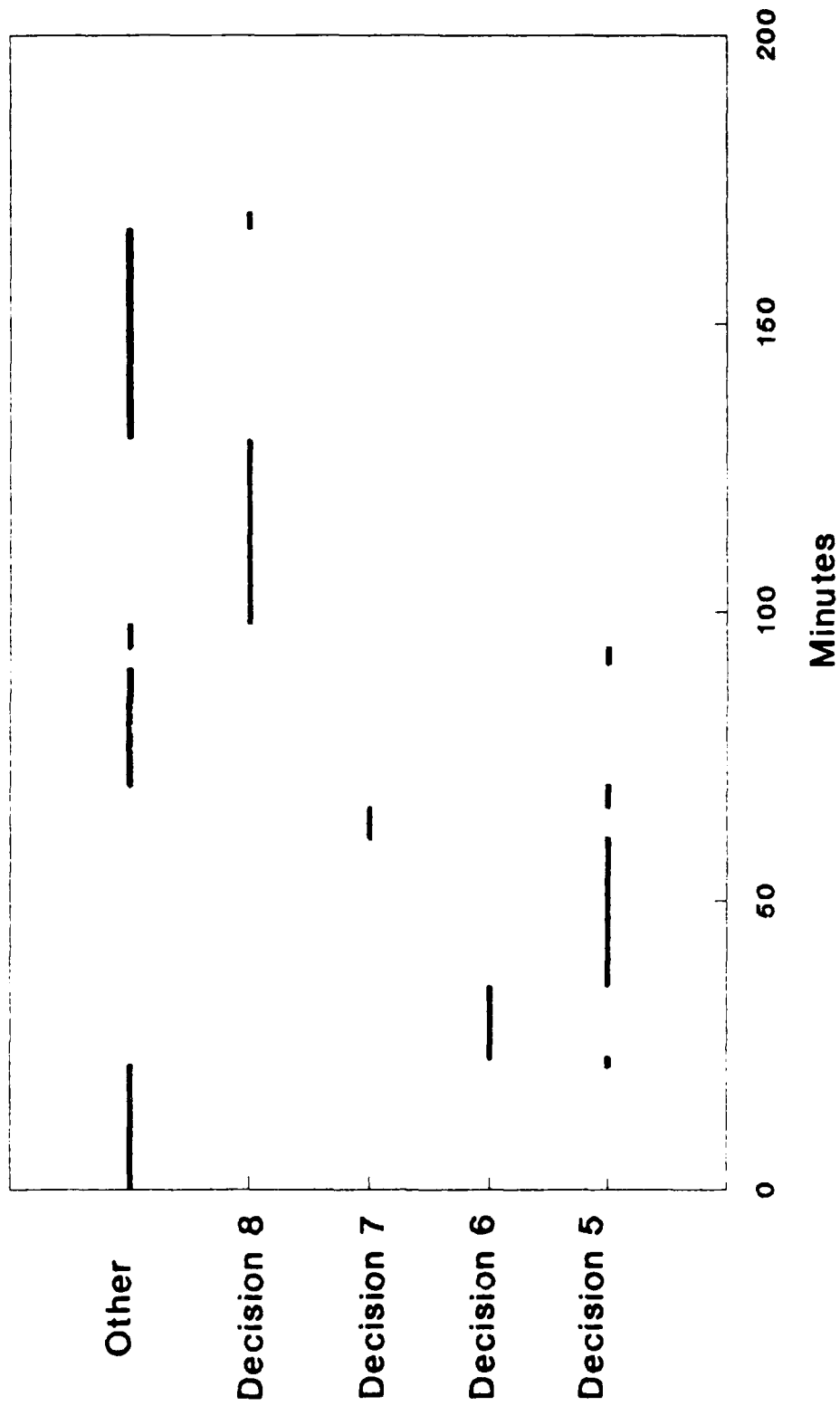| DECISION	TRIGGER	IMPACT TIME	DELAYS	DISRUPTIONS	PROCESS CONTROL	SPEAKING PATTERN	# PARTICIPANTS	DECISION REACHED
1	No	<1 Week	5	0	Combination	Random, Sequential	10	Explicit
2	No	<1 Week	1	0	No	Random	5	Explicit
3	No	<1 Week	0	0	No	Random	7	Explicit
4	No	<1 Month	1	0	Yes	Sequential	4	Explicit
5	No	<1 Week	2	1	Combination	Random, Sequential	10	Explicit
6	No	<1 Week	0	0	No	Random	4	Explicit
7	No	<1 Week	0	0	No	Random	4	Explicit
8	No	<1 Week	1	0	Combination	Sequential, Random	10	Explicit
9	No	<1 Week	0	1	No	Random	3	No
10	No	<1 Week	0	1	No	Random	5	No
11	No	<6 Months	1	0	Combination	Random, Sequential	9	Explicit
12	No	>12 Months	1	0	No	Random	6	Implicit
13	No	>12 Months	0	0	No	Random	7	Implicit

Figure 4. Day One Decision Timeline
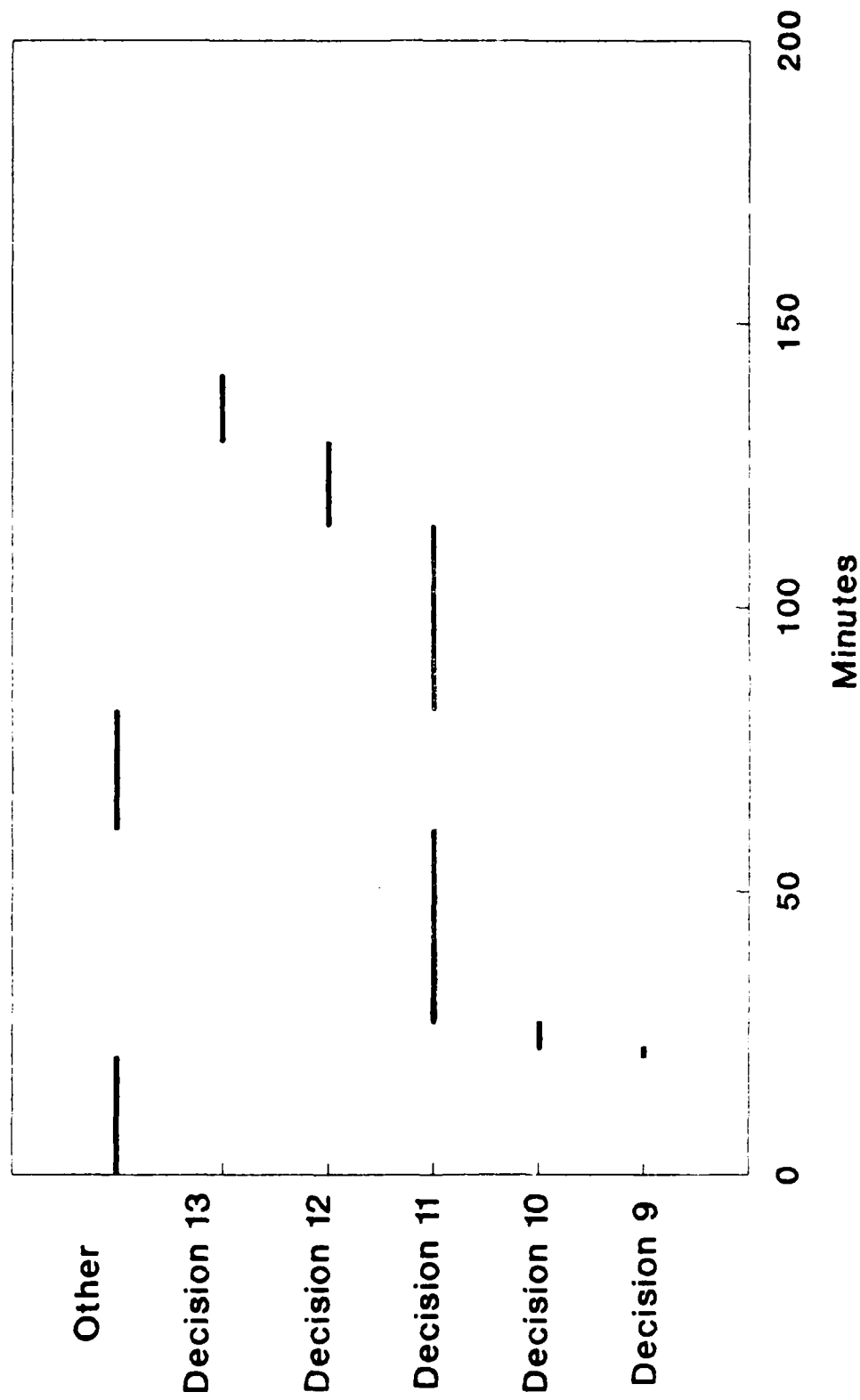
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Figure 5. Day Two Decision Timeline

Figure 6. Day Three Decision Timeline

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